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PROCEEDINGS

—OF—

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*The Surg. Soc. of the Wabash, St. Louis & Pac.  
east of the Mississippi River.*

THE FIRST THREE MEETINGS

—OF—

THE \* SURGEONS

—OF THE—



EASTERN DIVISION, W., ST. L. & P. R'Y,

—HELD RESPECTIVELY AT—

DECATUR, ILLINOIS, JAN. 25, 1882.

FORT WAYNE, INDIANA, JUNE 4, 1883.

SPRINGFIELD, ILLINOIS, APRIL 30, 1884.

FORT WAYNE, IND.:  
GAZETTE BOOK AND JOB PRINT.  
1884.

*To the Members of the Surgical Association of the Wabash, St. Louis  
& Pacific Railway :*

GENTLEMEN—I have the honor to present to you this volume of the transactions, together with the papers read at the three very interesting meetings, held, respectively, at Decatur, Ills.; Fort Wayne, Ind., and Springfield, Ills. You will find many imperfections in the book, but I can assure you I have given a great deal of time to the publication of the transactions, and think it a very valuable work. Unavoidable circumstances delayed the publication some time. Thanking the members for their courtesy and kindness in the past, and asking their pardon for the delay, I am

Yours Respectfully,

C. B. STEMEN.

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*PROCEEDINGS OF THE FIRST MEETING OF THE  
SURGEONS OF THE EASTERN DIVISION OF  
THE W., ST. L. & P. R'Y.*

The Surgeons in the employ of the Eastern Division of the W., St. L. & P. R'y Co., met at Decatur, Ills., on the 25th of January, 1882, in accordance with the request of the Chief Surgeon, Dr. J. T. Woods, of Toledo, O., and convened in the City Council chamber at 9 o'clock A. M. Dr. Woods called the meeting to order and read a very interesting salutatory paper on the "Organization of Railway Surgery." After the reading of the paper the meeting adjourned to meet in the afternoon at 2 o'clock.

The surgeons met according to adjournment, and were again favored by hearing a very able paper from Dr. Woods on the "Transportation of the Injured." After the reading of the paper, a permanent organization was effected on motion of Dr. A. H. Shaffer, of Huntington, who also moved that Dr. Woods be made permanent President of the organization, which was unanimously adopted.

On motion, Dr. W. J. Cheneworth, of Decatur, Ill., was elected Vice-President, and Dr. C. B. Stemen, of Fort Wayne, Ind., Secretary. After the organization and the election of officers, a general discussion followed on the papers read by Dr. Woods, which was participated in by quite a number of the surgeons present; and some very practical suggestions were made by Drs. Beasley, of Lafayette, Ind.; Beard, of Vincennes, Ind.; Cheneworth, of Decatur, Ill.; McMahan, of Quincy, Ill.; Shaffer, of Huntington, Ind., and others.

The members present at the meeting who furnished the secretary with their name and address, are as follows; Dr. J. T. Woods, Toledo, O., Chief Surgeon; Dr. J. S. Gregg, Fort Wayne, Ind.; Dr. C. B. Stemen, Fort Wayne, Ind.; Dr. W. H. Bell, Logansport, Ind.; Dr. J. C. Hearne, Hannibal, Mo.; Dr. A. L. Elder, Fisher, Ill.; Dr. C. V. Rockwell, Taylorville, Ill.; Dr. Jno. C. Walker, Indianapolis, Ind.; Dr. R. W. McMahan, Quincy, Ill.; Dr. A. D. Coe, Mexico, Ind.; Dr. P. H. Barton, Danville, Ill.; Dr. F. W. Beard, Vincennes, Ind.; Dr. A. H. Shaffer, Huntington, Ind.; Dr. Geo. F.

Beasley, Lafayette, Ind.; Dr. W. B. Graham, Noblesville, Ind.; Dr. T. B. Campbell, West Lebanon, Ind.; Dr. Alex. J. Mullen, Jr., Michigan City, Ind.; Dr. W. J. Cheneworth and Dr. Cass Cheneworth, Decatur, Ill.; Dr. D. J. Swarts, Butler, Ind.; Dr. Wm. Scott, Kokomo, Ind.; Dr. G. W. Parker, Cairo, Ill.; Dr. A. U. Williams, Sullivan, Ill.; Dr. A. T. Darrah, Tolono, Ill., and Dr. N. N. Vance, Bement, Ill.

On motion it was ordered that the organization shall be known as the Surgical Society of the W., St. L. & P. Ry., east of the Mississippi River.

It was ordered that the papers read by Dr. Woods, together with the proceedings, be published in the *Fort Wayne Journal of Medical Sciences*.

A vote of thanks was tendered to Dr. Woods for his able and instructive papers.

It was ordered by the members that the President shall call a meeting of this Society whenever he may deem it expedient.

On motion, the Society adjourned to meet at the call of the President. In the evening the surgeons met again in the City Council chamber with the City Council and other citizens of Decatur, and spent the evening very pleasantly in social conversation until about 9 o'clock, when, in response to an invitation from Dr. W. J. and C. Cheneworth—who are entitled to much credit for the manner in which they entertained the surgeons present at this meeting—the crowd repaired to Wood Bros.' Restaurant, and partook of an excellent and refreshing repast.

After a vote of thanks to Surgeons Cheneworth, the medical gentlemen went their various ways, all delighted with their first professional association.

C. B. STEMEN, M. D.,  
Secretary.

J. T. WOODS, M. D.,  
President.

## SALUTATORY.

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# ORGANIZATION OF RAILWAY SURGERY. ✓

By CHIEF SURGEON J. T. WOODS.

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Prior to any organization, if such a step should be deemed best, I desire to call your attention to the fact that as a formal meeting of railroad surgeons, this is the first that has ever occurred. Whatever the result, we are, so far as I know in that matter pioneers; and it seems to me fitting that I should at this time make some general observations chiefly in the form of a brief sketch of the organization we represent.

I do not wish to be understood as stating that this is the first attempt at surgical railway service, for many companies have at various times undertaken the difficult problem with more or less success; but of their methods I have never been able to obtain any definite knowledge. I speak of it as a difficult problem advisedly; for there are many varied interests that must be reconciled in order to secure a satisfactory working system. These complications are embraced in the relations existing between the company who employs, employee, and the medical gentlemen who may be called upon to render service to those who are unfortunately injured.

It may be dangerous ground, but I cannot forbear to make some observations on these relations, and would premise them with the remark that I have found that men generally, either singly or in combined capacity, keep a sharp look out for "number one." This idea



concentrated means "business." The use of available means to make money is "business," and it is to that end that individuals strive, and for that purpose companies are formed. The type of a company is found in every sphere of life. The man who singly works out his life problem, is his own company, president, secretary and treasurer. He keeps careful note of gains and how to secure them, and strives to show a margin in his favor at the end of the year. The farmer is not indifferent to shades of value in the articles he has to sell. It is his business to get all he possibly can, and right carefully does he attend to that point. The merchant who would avoid bankruptcy is equally cautious and careful in buying and selling, the philosophy of both being to obtain as cheaply as possible and sell for the highest prices attainable.

The laborer, citizen and professional man all seem to be actuated by the same idea. Get into a legal entanglement and you will be pretty sure to find an attorney who will fully calculate the degree of your embarrassment, the weight of your purse, and govern himself accordingly. Even Doctors have sometimes been presumed to be a trifle calculating and grasping. A company is, so far as I can see, actuated by much the same idea and show similar results. Organized for a special purpose, they invest their money assuming risk of loss, and strive to secure gains. Like the single individual they look out for expense and take advantage of circumstances that enable them to obtain profits, hoping—often fruitlessly—to find at the end of the year a satisfactory margin. It is true an organization may be severely exacting, even tyrannical, but a parallel in a smaler way may be found in every neighborhood. Then, it seems to me, that in justice, one is entitled to the same principle of treatment as the other. If this position be correct, or even approximately so, then the relation of employer to employe is much the same everywhere, and a company is entitled to the right to consider its interests in whom it employs, what their wages shall be, and, in case of injury, what it will do. As in case of a private individual, self-interest must be allowed certain scope. Railroading, like farming, merchandising or professional work, is not prosecuted for amusement, but to make money. I see little difference between an employe on a Railroad or one with a Merchant, Doctor, Lawyer or Farmer. In each case the duties and dangers are



understood, the pay agreed upon and the chances accepted. In either position an injured employe cannot justly *demand* care, and on the part of the employer it becomes a question of humanity and what he can offer or is willing to appropriate for the purpose.

The medical man becomes at once involved, but without the alternative of choosing. Humanity demands his services, and they are freely rendered. But who is to pay him? Does the Merchant, Doctor, Lawyer, or Farmer employer, in such a case, hold himself responsible? Not by any means, and why is not the rule general? Unfortunately for the medical man those most liable to be injured in railroad service are without means, and often so mutilated that thereafter they can only expect to make a bare living; and, financially, the Doctor is "left out in the cold." We all understand well the chilly atmosphere to which I refer. Very little experience will convince any one of its effects. In short, recompence, as a rule, is a total failure.

Now, taking this as a rough outline of the logic of the case, I am sure Railroad Companies as a whole have not shown themselves to be so excessively hard hatted as they are popularly supposed. On numerous lines they have striven to do something toward caring for those injured in their service. More or less system has been attempted, but the work was so desultory and unsatisfactory, and finally so expensive, that it usually has either gradually dropped to pieces or been suddenly abandoned, as is the case on the whole system controlled by Mr. Vanderbilt, in which the company now take no care of any one, and the medical man who serves the injured must look to the patient for pay, the maimed men who have not the means, however well disposed.

But, notwithstanding the fairness and conclusiveness of the argument, there still remains the question as to whether it is always best to be too severely logical. Large masses of men engaged in the same service acquire views that seem to grow out of their especial occupation. These views on certain occasions become the basis of action, and often make serious complications. The combined opinion of a large mass of men is temporarily more powerful than logic itself—opinions become impulses and excited impulses are unreasoning as a whirlwind. Railroading is a civil service, but it smacks strongly of

the military, and all concerned seem to acquire its spirit and expect what pertains to it. Employes to a great extent are homeless men, and if injured are like the soldier, without a shelter or the means that will purchase it. In this strait they naturally turn to their employers as their friends, or at least those most entitled to befriend them. It often occurs that there are no others who are under the least shadow of obligation.

To comply is to secure the regard of all, to refuse engenders a feeling that one day may present itself in a disagreeable form. Between logic and this feeling growing out of the special occupation, the management is left to choose. Some prefer to sow the wind and take the chances as to the possible whirlwind, while others select to bend hard equity in the direction of humanity, and I think the latter act wisely. The whole is a business problem with such strong leaning to the immediate money view, that when in 1875, I suggested the question of Surgical Service on the Wabash to Gov. J. D. Cox, then its President, the outlook was rather dark. He at once presented me with the foregoing ideas as to the relation of employer and employe, and further that the Company was legally responsible for but few of the injuries received, and neither legally nor logically under obligation to render aid; and that if such a measure be attempted it would lead to expectations equivalent to a demand to *care for all*, and at such vast expense that the Company could not afford and would not undertake to meet it. There was in him no want of the feelings of humanity, but that of real duty, real obligation, and can we afford to do it. The whole question was brought down to the common standard of business.

I expressed my belief that it was possible to arrange a system that would secure the best service to those *they desired* to care for, that would not grow into an imposition, and could be carried out at such limited expense that on the whole nothing would be lost to the organization and possibly a gain made by securing the higher regard of the employes, as they would feel that an interest was taken in their welfare that would prompt them to greater care and efforts in matters of welfare to their employers.

With misgivings on his part, and not without some doubt on my

own, he consented and I undertook the experiment. It was an experiment, and that only. I had not a glimmer of light ; no kind of model was known to me. I started with timidity, but resolutely determined to succeed in finding, in each of certain localities, a good and reliable surgeon who would serve the company on such conditions that, as a whole, advantage would accrue to the employers, the employe and and the medical man themselves.

Although I was everywhere met with the utmost cordiality and kindness, I found the task neither uncomplicated nor particularly agreeable. At some points I found a disposition to introduce local professional animosities, and the men themselves were timid and often preferred to choose their own surgeon in lieu of the one selected.

I also found that to secure the desired statements in reports of cases I had to arrange a blank form, and bills were presented in the most incongruous shape until I prepared a blank for that purpose also. By dint of perseverance and using the knowledge acquired as I progressed, a system gradually developed that has so far given such satisfaction to the management of the company through its various changes, that it has been maintained to this day. It has not, so far as I am aware, grown into the feared imposition, nor has there occurred onerous expense to the company, and has secured to the unfortunate employes the very best surgical service, at the same time affording the surgeons, as a whole, more remuneration for their work than they would have obtained had they done the same in the ordinary way.

The natural and pardonable timidity of employes in regard to the chosen surgeons has gradually melted away, as they have not been slow to note that men who are expecting and hold themselves prepared for this special duty are none the less careful, and are, because of their assumed responsibility, more ready with appliances in greater perfection, than those who are otherwise wholly engaged. They have also learned that each in his locality stands among the very first in his calling, a guarantee to them that they will be treated with that promptness, care and humanity which is the highest merit of the surgeon.

In the same direction and of vital importance alike to the employer, the patient and surgeon lies the fact that familiarity with this species of work leads to fewer unsatisfactory results than could be otherwise ex-



pected. Those who have had much experience in railway surgery are aware that the cases, as a class, are peculiar, and, to attain the best results, especial attention, coupled with practice among them, is of inestimable value. These, among many others, are the advantages brought to the service of injured employes, as well as to the company by their medical officers, and, as I believe, in greater degree as they are more perfectly organized and work in systematic harmony.

It is especially gratifying to me to be able to state that ever since the organization of this corps we have received the most cordial support from the management of the road.

This embraces Governor Cox and Colonel Hopkins, of the original Wabash, and finally Colonel Andrews, who was, until recent changes have placed him in a higher position, the general manager of the eastern division of the Wabash system, embracing far more than the original road. Their desire has been to deal with the utmost kindness and generosity toward the injured within the limit of business possibilities, and I think that they are deserving of the highest regard of those over whom they have exercised managing control. Our efforts have been and are appreciated, and nothing so far as I am aware, has ever been suggested by them that was not only fair, but just and honorable. They have only demanded that the case be deserving, our work well done, and the expense kept within the limits of business endurance.

There have been recently added to us a number of new professional gentlemen, of whom I know comparatively little, but with whom I am well pleased. Of those who have served from the beginning, I can only speak in terms of praise. They have shown themselves highly competent, as well as willing and painstaking. I do not believe that, as a whole, better professional men ever served an organization.

Gentlemen, having thus given you brief but formal greeting, I have only to refer to that which is well known to many of you.

This meeting was called after many requests, and was long delayed for reasons that need not be stated.

It is not designed to be made heavy by formalities and hard work, but rather a social occasion, affording all an opportunity to become acquainted, and to consult together on such themes as seem to you best.

Plans for the future may be prepared if thought expedient, but I would advise that the matter be well considered, and that nothing be done in haste.

There remains for me only to thank you heartily for the duties done, the courtesies extended to me in the past, and the attention with which you have attended to these observations.

I trust that you will introduce each other when necessary, and let no means of personal enjoyment pass without improvement.

## *TRANSPORTATION OF THE INJURED.*

By J. T. WOODS, M. D.

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In its strictest sense the duty of the medical man is humanitarian. His highest function is to preserve life and next to that, to save from suffering. This is especially true of the surgeon whose path of duty leads directly to the sufferer, and whatever high examples may present, I maintain that in him, rudeness, indifference to humanity and the omission of any possible means of alleviating it is wholly inexcusable. In actual practice both causes and consequences are ever present, the means of alleviation not always apparent or of easy attainment, but still worthy of the most earnest inquiry and careful effort toward removal.

Neither is it always in great and showy ways that we are to do the most actual good to those who fall under our care; but little things, the veriest trifles professionally considered, are often of mammoth proportions to the sufferer. The party he is to consider is the sufferer only.

Our duty to a patient begins on the first moment of our arrival, and everything thereafter should be directed with scrupulous care, for every twinge of pain is a blow at life. For this reason both patients and surgeons are thankful for anaesthetics, and the former is relatively as grateful for avoidance of the dread agony in every step preparatory to the operative work proper.

These reflections have prompted me to present some rather crude suggestions in relation to the handling and transporting of those who are injured, both before and after operation. The ideas are to some extent applicable wherever bodily suffering exists combined with the necessity of removal, but I desire at this time to call attention to physical injuries, and more especially such as are incident to surgical railway service. I am not unaware that few rules or specific directions can be laid down, as conditions in every way vary, yet reflection and



suggestions may prepare us to more readily and effectually do the duty of a special occasion.

Whether the accident involve few or many, the surgeon usually, arrives after the lapse of some time, during which interval much has been done as seems best to those present, but on the arrival of a medical man he becomes the director of every movement, and with discretion can conduct future proceedings much as is in his judgment seems best.

The railway surgeon is supposed to, and always should have, his instruments and appliances ready at hand, so as to be able to move with brief notice. These instruments and appliances should not be numerous, and all parties will find that whatever the surgeon may bring nothing will be more valuable where there are badly-injured persons than a pair of *stretchers*. For the reasonably proper handling of the kind of patients that usually are found by us, they are absolutely necessary. There should be a pair certainly at every point where there is a surgeon, and they should accompany him in his response to a call. Some months since I stated this fact to the Superintendent, Colonel R. Andrews, and he directed the immediate making of a limited number, but the shops have been so crowded with work that could not be deferred, that they are not as yet completed. I do not hope to get enough made so that I can do more than place one at the points where the greater number of accidents occur, and venture to suggest that in lieu of a better, an appliance that will serve a good purpose may be easily and cheaply made by even a rude workman.

If two pieces of scantling  $7\frac{1}{2}$  feet in length and 2 by  $2\frac{1}{2}$  inches in width, rounded at the ends so as to form convenient handles, and a light piece placed across at the distance of eight or ten inches from either end, and efficient frame will be formed. From outside to outside of this frame should measure but 21 inches, which is wide enough to carry a stout man, and will pass through the guard rail posts and door of a passenger car. By nailing over this a piece of canvas, or if that is not available any stout material, as two thicknesses of ticking, you have a simple and cheap stretcher. The cloth should not be stretched very firmly, except at the ends, as a little bagging will afford much easier rest for the body. Of course it is very crude and insufficient, but so much better than none, that it seems to me that its cheapness is worth our consideration.

A really good stretcher is so valuable that I have devoted some thought to the subject, and those that are being made for our use, will fold together for convenience of carrying, the folding cross bars so constructed that they will not cut the canvas, and the legs automatically held in place whether down or up, all staples and hooks, that are always in the way, being dispensed with. In my judgment it is beyond improvement, having other valuable features. The canvas is as short as will answer the purpose and the handles not more than eight inches beyond it. The length is usually greater than is necessary. Its width is such that it will just pass through the door of an ordinary passenger coach, a feature the value of which will be shown in our explanation of it in use.

Having then a case of fracture, lying on the ground, the first thing that would present would be the application of support on the outside of the clothing for the purpose of preventing the sharp fragments from doing harm in handling. These may be made of any available material, pasteboard, a shingle or strip of board, and held in place by bandage, cords, in short, anything that will answer the purpose. I have thus temporarily dressed a fractured leg with a few corn stalks, or lashed one leg securely to the other with a couple of handkerchiefs. In case of a crushed limb the parts should be so managed as to drag as little as possible.

The next step is to *put the patient on the stretcher.*

The best method I have found is to place one or more men on the *right side* of the patient, their duty being to lift the body. Two take position on the opposite side to raise his legs, head and shoulders, standing as near as practicable to the upper and lower part of the body respectively. Show them where to take hold and what to do “all together” *when you command.* At the word the men will lift the patient directly upward just far enough to permit the surgeon to slip the stretcher with its legs folded up under the patient’s hips *from his left side* and sliding it quickly as near under and parallel to the body as possible. The patient has thus far only been raised upward a few inches, and with a very slight lateral movement almost without moving their feet, those that hold can lay him gently down on the canvas. To avoid contact with the ground the man who handles the stretchers should keep the end on which the body is to be placed a little elevated. At once the

other end is raised and the sufferer has been made ready for removal with very little annoyance. If the body be very heavy or the assistants few, those who lift may take the patient by the shoulders and raise the body and hips off of the ground. The stretchers being then slipped under, one man may take the legs and by simply turning the body on the nates as a pivot effect the desired result.

In neither case has the body been jolted and dragged by raising far from the ground, and especially has the jolt, jar and dragging of carrying in arms by inexperienced men been avoided.

From this the sufferer should not be moved until he is to be placed *on the operating table or in bed*.

The method suggested for accomplishing the latter is to fold up the legs of the stretcher and carry it somewhat diagonally across the table and near to the surface, the patient's right hand being toward the pillow. In this position the patient on the stretcher is allowed to rest on the table. Those who are to lift the body are placed at the *patient's left side*, those who handle the legs at his *right side*. Taking hold at the word of command and lifting together, the body is raised so as to clear the stretcher which is then easily withdrawn, and by a slight movement of those holding the body, it is placed in the desired position.

*Removal from the table* is effected in nearly the same way that the body was first placed on the stretcher; and he may be laid in bed with as little discomfort as occurred in placing him there.

To do this most satisfactorily, you will carry the stretcher beside the bed, the patient's right hand being next the pillow. Carry the foot of the stretcher diagonally across the bed. Two men on his left side now raise the body, one handles the legs, while the surgeon slides the stretcher from under him,—which is usually easiest done from the foot,—when by a slight movement the assistants lay the body in its place.

It not unfrequently occurs that we are required *to place patients in the cars* either before operation and perfect dressing, or very soon thereafter, and how to do it most readily and comfortably has been to me not a little puzzling.

The baggage car is most convenient of access, as a cot can be passed through the side doors. It is, however, a rough place for a vigorous man to ride, and does not answer well for the injured, even with the aid of a cot, except for short distances. I have also suspended a stretcher from the roof by means of ropes which answered passably.



This method is greatly improved by the use of long India rubber bands slipped over the end of the stretcher handles, the ropes being attached to them and the timbers above, their elasticity partially breaking the jar of the car. These bands being usually unattainable and also liable to break, render the plan practically useless, and so far as the baggage car is concerned we have left only rope suspension and the cot.

In emergencies such as we are contemplating, the sleeping car is usually occupied and its use impractical, for the further reason that it is nearly impossible to get an injured man through the various passages leading into the seat or berth apartment.

There is, then, nothing remaining but the passenger coach, and the problem is to take what is at hand and make out of it a bed in which a patient with crushed legs, arms or ribs, or suffering from concussion, can be placed easily, and on which he can ride without detriment.

It can be done in this way : Take the back off of one seat. This is done by the removal of a few screws, and a screw-driver will always be found in the possession of the engineer. Turn right and left the seats next before and behind, so as to leave the space of three seats open. Then take the cushion off of the seat from which the back has been removed, and turn it upside down on that at one end of the proposed bed, place another in the same way on the cushion at the other end. We then have an open space of sufficient length and a double set of springs on which to place our support. If we now have our patient on a stretcher that is narrow enough to go through the car door, he is not to be removed from it, but the whole passed between the iron posts and through the door into the car, the carriers taking hold of the cross bars in lieu of the handles, in passing through the door. Of course the cars must be separated to secure the necessary space between. The stretcher with its contents is now to be laid down, the ends on our double cushion springs. If the handles are too long to lie between the open seats, one back may be raised and they be allowed to project beneath it. This, it seems to me, is not only a comfortable, but a thoroughly practical means, provided we have the stretchers, and those that are made sufficiently narrow. By it the sufferer will not have to undergo the lifting and handling, that is often nothing but torture, from the time he is picked up until he is laid in bed or on the operating table, an avoidance of suffering that is not appreciable to those who have not experienced it.

But we are very likely not to have the stretcher and the patient is placed on a board. In that case I would try to arrange the board and patient exactly as I have described, believing that the double springs referred to would make it a more comfortable arrangement than can be constructed in a baggage car. Without removal of the back of a seat, which might by some mishap be impossible, the backs of two may be raised horizontally, one seat intervening. By fastening them in this position a stretcher may be laid on them, but the whole jarring of the car will be communicated to the patient and add greatly to his discomforts.

In lieu of this another method suggests itself, but it involves the lifting and handling of the patient, the very thing to be avoided.

It is this: take the cushions out of *the three seats*, the backs of which are arranged as first described. Lay a piece of board, small pole or anything that will reach across them at either end for a support. Place the three cushions side by side on these supports, and with one cushion in addition the whole surface will be covered. On this bed two persons can lie quite comfortably for even a long distance.

Of course varying circumstances will suggest modifications of the methods proposed, but it seems to me a valuable thing to know that in a dense forest a common railroad car may in a few minutes be made a comfortable means of conveyance for one whose life is well nigh crushed out of him, especially when we remember that the sufferer may be you or me.

To recapitulate, we have found our supposed patient on the ground, have lifted him directly upward a few inches, slipped the stretcher under him, carried him to the baggage car, and supporting the stretcher either by its leg, or by placing its ends on boxes, or by suspending it with ropes, or better still, we may have carried him through the door of a passenger coach and placed the whole on the double cushions as described, then on arrival at his destination he has been carried to the operating table without having once been raised up, and one slight movement places him on the table and another in bed, every step being so conducted as to avoid to the last degree the injury that pain produces, and this branch of my subject is exhausted.

But this problem occasionally presents itself in another and really embarrassing form. It may be necessary to move a patient whose legs have been broken, long before recovery is sufficient to permit

its use in walking. We will suppose he gets about readily with crutches, but is unable *to go up or down a stairway*, cannot safely attempt even the steps at the front door.

In that case select two men, one of whom is rather tall and the other of less height. Place your patient at the top of the steps, the injured side turned a little forward so that the broken leg will swing clear in the future movements.

The tall man taking his place at the side of the injury, the patient puts his arm around his neck, and the shorter man takes his place in like manner on the opposite side, both placing their arms around his waist. The tall man steps down one step when all is ready. The injured leg swings clear, and the two men, slightly aided by a springing effort of the patient, easily lift him sideways and plant him on his sound leg one step downward, and thus slowly and steadily, step by step, to the bottom. The same maneuver will take him up stairs, save that in going up the short man takes the advance. This method is entirely practical, but a strong-armed, low-back chair may be used satisfactorily. The patient being seated in it, one man steps in front and takes firm hold of one of the rungs; another seizes the back, and by moving together walk up or down stairs with great ease and safety in either direction, one of the carriers moving backward. The chair has this further advantage: When it is necessary to place the cripple in a wagon, a light, open-bodied spring being the best, he may be lifted into and out of it without leaving his seat until his arrival at the station, and in fact by no other means can be so readily got into or off the car platform, as by carrying him up and down the steep, long steps by the same method. Either of the methods just described will answer, but the latter is no doubt most generally applicable, and when the dreaded adventure is over an astonished patient will thank you.



*On Sponge Grafting*, by F. L. MATTHEWS, M. D., Springfield Ill.

Read at the annual meeting of the surgeons of the Wabash, St. Louis and Pacific Railway, Fort Wayne, June 4th, 1883.

I feel assured that, upon the present occasion, it will not be amiss to rehearse some of the many ideas that crowded upon me after reading the communication from our acknowledged head, our worthy presiding officer, announcing a called meeting of his corps, coupled with an invitation to prepare for the same a paper upon some topic pertaining to railroad surgery. In casting about for a subject that might prove of general interest, I finally selected that of the sponge grafting, including some new applications of the method to our common theme—railway surgery.

It is interesting to note the mutual dependence of the sciences—how developments in one suggests a new field of research in others. Till microscopical investigation revealed the existence of enemies to all open wounds everywhere pervading the atmosphere, we heard nothing of antiseptic surgery. This thought, traced through the history of the past, reveals the fact that every effort at surgical advancement that neither transgresses or fails to harmonize with natural laws, proves abortive.

How shall we account for the absence of pus in the healing of wounds by first intention? Is it not because the material furnished by nature's process for cementing opposing parts are all conserved, and hence debris? This is an instance of nature's power of recuperation, under favorable circumstances. The province of the surgeon is to intelligently interpose in behalf of crippled nature, to supply all deficiencies, as far as may be, and remove all hindrances to her perfect work.

To secure a full reward, the gardner is driven to the necessity of constructing trellises to support and protect from destructive influences the tender plant under cultivation.

This is one of the important offices filled by the sponge, forming a trellis or scaffold for the support and protection of numberless vascular loops (which investigation proves to be nature's first restorative effort), these loops making a vivified net-work—every interstice to be filled,

every loop surrounded with living plasma, endowed with all the necessary elements of tissue organization.

Wherever the skin is lost, the circulation, unrestrained by its binding force, and impelled by the heart's *vis-a-tergo*, tends to establish this process, but, unaided, the surface is soon coated with pus, which means destruction of the elements necessary to success. To what extent nature can, or will battle against such difficulties, depends much upon the vigor and constitution of the subject. In excavated wounds, with great loss of tissue, completely surrounded with healthy edges, the filling up process, though lingering, will be accomplished, but with markedly different results than if aided as above mentioned.

In such favorable cases the filling up would be expedited, and the character of cicatrized tissue. Be it remembered, that the subject of the sponge grafting includes not only the application of the antiseptic sponge—the wound being properly prepared,—but such dressings as exclude every noxious influence inimical to the reparative work, insuring the perpetuity of nature's entire armament, until that formative material has reached the point of organization which secures its safety.

This process promises success in recent wounds of fingers, where the bone, having escaped severe injury, is laid bare. Two instances have lately come under my notice, left to the usual careless mode of dressing, in which the bird's claw appearance, the extreme tenderness and consequent uselessness, make them a source of lasting regret that at the outset they had not been sacrificed. I am sure that, in these cases, had all the material which nature supplied been conserved, those denuded bones might have been so recushioned as to have presented a slightly appearance and proved useful members.

While in railway surgery the majority of accidents to hands and fingers are so destructive and crushing as to necessitate the removal of injured parts, the kinds of casualties above cited are not infrequent, and in many instances, where the anticipated danger of septic poisoning not only warrants but would seem to necessitate removal, such dangers might be avoided through the antiseptic precautions observed as part of this plan, and many members restored and made useful that under the ordinary plans, must have been sacrificed. The sponge, whether applied to a comparatively recent wound or to an ulcerated surface, disappears by absorption, and the facility with which

it is so removed has led to its adoption. Time has demonstrated, not only the feasibility, but the success of skin grafting, but the object of skin grafting, strictly speaking, is to expedite cicatrization upon extensive granulating surfaces ready for that process. Sponge grafting favors the work of proliferation; in other words, encourages granulation, and is adapted to excavated ulcers, or to the rapid reproduction of soft parts, where, unaided, nature would fail. The success is due—first, to the mechanical support given to the vascular loops permeating its substance until nature provides the material for perfecting tissue organization; and, secondly, to the protection, both of the antiseptic dressing employed, by which degeneration, and consequent loss of nature's material, is prevented, thus economizing resources and obtaining good results where naught but economy could prevent a failure.

For this purpose, the finest surgical sponge is selected and thoroughly cleansed—first, by beating out the loose sand, and then washing in pure cold water; then soaking in officinal dilute nitro-hydrochloric acid for two days, which clears it of all silicious and calcareous salts. The acid is then neutralized, by soaking in a weak solution of liquor potass, and, after washing thoroughly in several relays of pure cold water, is then put into a jar containing a five per cent solution of carbolic acid, and tightly corked. It may be thus kept, and is ready for use after one week. The condition of the ulcer will determine somewhat the manner of application. Where proliferation, or increase of tissue, is demanded, the amount of sponge necessary will be greater than where cicatrization is the sole object. In the first case, in evenly distributed support is demanded; in the latter, where granulation is perfected, comparatively little is required. Those who have enjoyed a more extended experience in both skin and sponge grafting, report that when cicatrization is the object a very scattering application is all that is required, each producing a center, from which soon springs a perceptible band, that meets a similar one from its neighbor, dividing the surface into areas, dependent in shape upon their mutual relation. All observers assert that their use is immediately followed by an increased activity in the limiting edge.

In all cases the surface must be very carefully prepared, the cleansing work so skillfully done as to avoid even wounding the delicate capillaries, since blood in the sponge will act as foreign matter and abort the whole process. A two and a half per cent. solution of



carbolic acid should be used in this cleansing work—the hands of the operator, the instruments used, and everything likely to come in contact with the parts, should be made clean by the same means. The pieces snipped off with scissors from the prepared sponge, to be used in any given case, should be allowed to fall into a two and a half per cent. solution of carbolic acid, and then transferred, with forceps, to their proper position. The pieces to be applied to a granulating surface should be small, varying from one-eighth to one-third inch in length. Such sizes I have found best adapted to fill the interspaces evenly.

In cases of comparatively recent date, excavated wounds, or loss of soft parts of finger ends, etc., where the reproduction of material is the object, large pieces may be applied, thicker somewhat than the lost tissue.

When the bits of sponge have been arranged and covered with a piece of protective, the full Lister antiseptic dressing is then applied and left untouched for several days. On the fourth or fifth day the dressings may be removed for examination, and any grafts that may have failed be replaced and strict antiseptic measures continued. At the first dressing the grafts generally will be found adherent, and the naked eye will discern a faint, white zone, surrounding each, which a one-half or one-fourth inch glass will resolve into bands of lymph, containing minute blood vessels, permeating the meshes of the sponge. The removal of a piece at this stage will be followed by an appreciable hemorrhage. At a later date, if examined microscopically, with a one-fifth or one-eighth inch objective, the interstices of the sponge will be found literally filled by a network of capillaries, acting as a guide for the necessary material surrounding them on every hand for tissue organization. Still later examination reveals commencing disintegration of the sponge, which, at about the beginning of the fifth week, has entirely disappeared.

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*Compound Fracture of the Lower Extremities*, by WILLIAM SCOTT, M. D., Professor of the Throat and Respiratory Organs, in the Fort Wayne College of Medicine. Read before the meeting of the Surgeons of the Wabash, St. Louis & Pacific Railway.

A compound fracture is an injury that always creates more or less anxiety in the mind of the surgeon. But when the injury has been produced by a railway accident, and the parts are lacerated by having come in contact with heavy timbers, cars, wheels, or any heavy moving body it is certainly to be regarded more serious than an injury produced by an individual falling, and the parts coming in contact with some fixed solid substance, the force no greater than the weight of the body. The difference is as great as that which exists between the latter injury and a simple fracture, or between a subcutaneous, and an open wound. On the former injury we have the shock, as well as the parts lacerated to such an extent that sloughing with all of its accompanying evils is liable to follow. In compound fractures it is the external influences that come in contact with the wound that is one of the elements of danger.

In preparing this paper, I have been obliged to notice the doctrines taught by some eminent writers. I have tried to quote their opinions fairly. The great danger of wounds of the character we are discussing has been noticed by the oldest practitioners of surgery.

Although the fact has been so long known and admitted by all writers on the subject, until recently no satisfactory explanation of the cause of the danger has been given. An occurrence so frequent and so interesting, as the complications that are liable to arise in compound fractures could not fail to attract the attention of pathologists of the highest order, and men whose scientific attainments entitle them to credit. But you find in their productions on violent inflammations of lacerated wounds, Erysipelas, Pyemia, Gangrene, or Septicemia, every surgeon has embraced that which accident prejudice or reflection has inclined him to adopt as his theory. However different the opinions of pathologists and surgeons have been as to the treatment of lacerated wounds, all the old surgeons agreed that air had an

injurious effect when it came in contact with wounds, Sir Charles Bell, Hunter, Albernethy, all of their age, recognized the deleterious effect of air. The generally received opinion then was, that it was the temperature of the atmosphere that excited inflammation, and some one said in support of that theory, in cases of emphysemia when the air is brought to the temperature of the body before it enters the cavity, we have no such an effect as inflammation, as the temperature of the body is always considerably above that of the surrounding atmosphere. Whenever a direct communication is made between a wound and the external air, a reduction of the temperature must be the consequence, and sudden changes of temperature, they claimed, was a predisposing cause of inflammation. As the old writers maintained in their day that it was the external influences that produced the complications that arise in lacerated wounds, we, their followers, admit. But what are these exciting causes? Late experiments seem to prove that it is not air, as decomposition does not take place in pure air; but it is the organic matter that floats in the air that is giving us the trouble. If the surgeon had the means of magnifying and analyzing the particles of matter that are continuously passing into the wounds that he dresses, he would not be amazed at his cases of septisemia, erysipelas, and pyemia, that follow his practice. The wound not only suffers from mechanical irritation produced by these atoms of dust, but it is the opinion of a large per cent. of the profession that these particles of organic matter carry with them the germ theory of disease as taught by Madagan is that many diseases are due to the presence and propagation in the system of minute organisms having no share in its normal economy, and the air is the agent by which they originally reach the system.

If we can rely on what they teach, we have to admit that certain forms of Micrococi and Bacteri exist in all infectious diseases; and they are certainly to be found in every case, Maclagan claims, that the Micrococi have different atoms in different diseases; but their physical characters and grouping as well as their local action classifies them sufficiently to constitute them a distinct species, each having a specific action, are producing a special form of disease, whether it be erysipelas, pyemia, septisema or gangrene. What is there in a compound fracture that makes it more serious than a simple fracture? but the decomposition of the soft parts that are destroyed, and the absorption



of the products of the decomposed tissue, which is facilitated by the presence of an open Medullary Canal, be one of the above named complications,—we know that septicimia or pyemia are liable to occur, and we cannot associate such symptoms with external influences only as the result of the organisms that have been allowed to come in contact with the wounds, producing fermentation, followed by putrification, with the absorption into the blood of the septic matter.

In erysipelas, we have a disease that is contagious, and results from the reception into the system of a poison from without. In traumatic erysipelas the poison has to be introduced into the wound or blood before it is possible for the complication to arise. The morbid anatomy of the local lesion of erysipelas has been carefully studied by Orth, Lukomsky, and VonKecklinhouser. The result of their observations is to show that the erysipelatious process is invariably associated with the presence of Micrococi. In the inflamed tissue, and the blood, Orth found that the infiltrated liquid of the swollen parts contained an enormous number of bacteria.

In hospital gangrene it is hard to conceive how any one that has watched its spread from ward to ward could claim anything else for the disease than that it was organisms carried from wound to wound by the atmosphere; and to arrest the disease we must destroy the germs that are thus conveyed. Every surgeon has drawn off pus from abscesses that was free from putrification was apparently healthy, without odor. But at the second dressing the fluid discharged as a rule is not healthy, and we will find active putrification going on in the cavity. I am convinced that this decay is caused by minute organisms or particles of matter that were conveyed to the cavity from without. It is a well-known assumption in surgery that a wound made in a healthy person will heal if placed in a favorable position for repair, and not interfered with. When repair does not go on kindly, it is to be presumed that there is something in the nature of the wound, or in the surroundings that is retarding the process of healing.

The first step in a compound fracture is to ascertain the extent of the injury. If large vessels and nerves are injured the question at once arises as to the propriety of trying to save the limb. In fractures involving the knee joint, before antiseptic surgery was introduced and understood by all surgeons, it was considered the safest to amputate. I see one surgeon in the Russian army reports eighteen cases of gun

shot wounds of the knee joint treated antiseptically with only three deaths. It is only recently in fractures involving the ankle joint, where there was a direct opening into the joint, that the authors on surgery would sustain us in a conservative course of treatment, but now we are expected save the limb. If we have to amputate, I would operate without delay, avoiding one shock, if possible. If we decide to save the limb, the next step is to cleanse the wound, and there is nothing, in my opinion, equal to hot water. I have been using hot water in all my lacerated wounds since it was introduced as a dressing, and I am well pleased with it. I cause a continuous stream of water as hot as I can bear my hand in, to be thrown into the wound continuing to irrigate the parts until all hemorrhage and oozing of blood has ceased, at the same time using a continuous spray of a  $2\frac{1}{2}$  per cent. solution of carbolic acid on and about the parts. I think the 20 per cent. solution is good to use if it does not come in direct contact with the wound. Some claim that nothing less will destroy the germs of disease. I think it acts as an irritant, and excites unnecessary suppuration of the parts. While the assistant is applying the hot water and using the spray, I would reduce the fracture, and remove all foreign bodies from the wound, shaving and cleansing the surface of the limb; then the wound should be adjusted, bringing the deep parts together, removing all tissue with the scissors that is destroyed to an extent that sloughing is inevitable. Then the wound in the lower extremities should be antiseptically sealed, using the antiseptic lint or cotton to the oiled silk over this dressing, fastening the edges of the surface of the limb with colodion, no drainage nor provision for it necessary at this dressing.

As far back as Sir Charles Bell's writing, he recommended this method of dressing wounds, not assigning the same reason that we do for the treatment, but he called it a smothering mode of treating wounds, stating in support of his method that he had noticed that wounds healed more kindly under a scab. When nature fails or has not time to furnish the covering, it is now expected of the surgeon. After a compound fracture has been dressed it becomes a question with some as to when it should be redressed, and some of the authorities fix a definite time for redressing.

Whenever a fractured limb is painful, or the patient complains of the dressing, or that the limb is not resting, or if there is any evidence

of hemorrhage or a discharge of any kind, it should be dressed without delay. If I succeed in getting my first dressing well applied, and there is no swelling or evidence of suppuration, I would not disturb until there was some demand for it. At each subsequent dressing, follow up the plan of treatment adapted, applying to the wound stimulants, if necessary. I have been well pleased with the rapid repair of tissue under this mode of dressing, and surprised at the small amount of suppuration and sloughing; and the fractures have, with rare exceptions, united as readily as simple fractures.

Immobility so essential to the success of a fracture is best obtained, in my opinion, with a fracture box, hinges to the sides, bran placed for the limb to rest on, and sand bags for compresses, using cotton, wool, or whatever suits best that is soft and warm to keep the foot and limb in proper position. The patient will rest better and be better satisfied if the limb is placed in a swinging position, when it can be done, but we have to treat every case on its own merits, as has been said by some one, generalizing our treatment and individualizing our cases. I have long used the Plaster of Paris splint in the treatment of fractures, and now that Stimpson has adopted a plan by which we can apply the anterior or posterior splint, to suit the wound, and remove and apply at each dressing. I intend going prepared to apply if desirable, carrying the shellac and paraffine as he uses it to protect the splint, and prevent the discharges from saturating it. I have long been convinced of the efficacy of quinine in arresting fermentation. In all my cases, before complication arises, I have been in the habit of giving quinine in from 3 to 4 grain doses, alternated with muriated tincture of iron, in doses suited to the stomach of the patient. A great many will not bear large doses of quinine or iron following and injury. I could report several cases of compound fractures successfully treated in this way, in some of which the question was raised as to the propriety of trying to save the limb. One especially, a railway accident; the subject a man sixty-eight years of age; a compound comminuted fracture of the ankle joint. He now walks without a cane. But it is unnecessary to report cases to a body of surgeons that have met to discuss principles in surgery. I am not one of those that believe that every case that makes a good recovery entitles the surgeon to credit, nor does it establish the merits of a mode of dressing. We have some remarkable cases with very unfavorable



treatment, some bad results with the best of treatment. Every surgeon must have confidence in some particular treatment, and believe in his plan of dressing, then enforce it. While one class claims that air is deleterious, we have such men as Teal, Humphreys, J. Y. Simpson, recommending the air dressing. While James K. Wood was a believer in the microcopic organism floating in the air he also believed that their deleterious effect could be sufficiently overcome by frequent washing with carbolized water. While the different systems are so unlike, and the advocates of each method refer to their clinical experience to prove their success, it leads to this conclusion, that modern scientists have it to settle, and the germ theory of disease will finally decide the best method of arresting the complications that arise in lacerated wounds if it succeeds in doing what its advocates claim for it.

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*Lacerated Wounds of the Extremities Requiring Amputation*, by WM. T. BEADLES, M. D., of Bushnell, Ill. Read before the meeting of the Wabash, St. Louis & Pacific Railroad Surgeons, at Fort Wayne, June 4th, 1883.

MR. PRESIDENT AND GENTLEMEN OF THIS SOCIETY:—I was requested sometime since to select a subject on railroad injuries, to be presented to you on this occasion, in as tangible a form as my experience and time would permit.

The subject selected is one of vital importance to the victims, those who are so unfortunate as to meet with such an accident, and to make it more unfortunate they are usually the result of their own carelessness, and as well as of great interest to the surgeon in their management—it is that of lacerated wounds of the extremities requiring amputation.

The rapid progress of civilization and development of this vast area of country, through the construction of the immense system of railroads during the past twenty-five years, brought with it a degree of carelessness and recklessness, that has been the means of many being crippled, as well as great loss of life. A class of injuries unknown to surgeons of thirty to forty years ago are now so common as to furnish

those of the present day with many examples of compound comminuted fractures of the most grave and serious character. These injuries, as well as those resulting from other machinery, as mills, threshing machines, cotton gins, or crushers of tile factoriers, are the result of the direct application of force to the limb in such a manner as to produce extensive contusions, lacerations and extravasations of the neighboring parts, as well as lacerations or crushing of the parts at the seat of injury; therefore, it is not uncommon in the amputation of such injuries to have more or less sloughing of the stump, unless amputation is delayed until reaction has taken place sufficiently to establish a line of demarcation between the healthy and unhealthy structures, but to delay the operation beyond the time, when reaction has finally taken place, is questionable. While it may be the opinion of some surgeons to delay amputating until positively known wherebest to perform the operation to secure sound flaps, it appears in my judgment to be of doubtful propriety, so much so that it has been customary with me to amputate as soon as the condition of the patient will permit, and sufficiently far from the seat of the injury as will secure a healthy circulation in the flaps, when it is possible to do so, as it is often the laceration is so extensive that the amputation has to be performed at or near the proximal end of the extremity, and then not able to procure sound flaps, as when the arm is lacerated or crushed above the elbow, the deltoid and pectoral muscles are drawn, and causing them to slough, and the same resulting from lacerations of the lower extremities above the knee. They often become exceedingly troublesome, requiring very close and long-continued attention before they slough out and heal up. To anyone not familiar and experienced in such cases they become extremely irksome, especially in those cases where the system has been poisoned from the effects of dissipation, more especially intoxicants. While it is much more agreeable to the surgeon to treat cases of amputation where the flaps are sound in healthy patients, but the ordeal comes in those who have contaminated blood and contused flaps. Patients are not made to suit the surgeon, nor can he have a choice in the constitutions they may occur in, but has to take them and do the best he can as they are presented to him. The constitution, as well as general physical condition of the patient, has much to do as to the result or prognosis in these injuries. While the most favorable results are found in healthy or unimpaired constitutions, the reverse is

the case in the impaired or contaminated constitutions; hence, the surgeon should be guarded in his prognosis.

The shock produced in many of these accidents results in extreme prostration, especially when complicated with internal injuries, as contusing organs of the chest, or bowels, or concussion of the spinal cord or brain, that are usually more dangerous to life than the mutilated limb, therefore the amputation should be delayed until reaction is completely established. These precautions are obvious, that death may not occur in the midst of an operation or amputation, when no prospect of reaction ever coming on, rendering the amputation unnecessary, as well as placing the surgeon in an unpleasant situation when uncalled for. Reaction seldom takes place rapidly, if at all, when one or more limbs are badly crushed very high up, especially if complicated with an internal injury. Occasionally a man receives an injury who has great tenacity of life, a nervous system that tolerates serious injuries, and most any operation, and then repeatedly, as it was during the late war, when now and then a man recovered from amputation of both legs above the knee at one time. A rather interesting patient was brought to me for an amputation above the knee, August 20th, 1882, by the name of William Russell, who met with a serious accident while endeavoring to get into a box car, as the train was moving, throwing his right leg under the wheel of the car, crushing it to the knee, requiring it to be amputated. He had a mania for stealing his transportation on the cars from his boyhood days; therefore he had met with several serious accidents previously, which resulted in the loss of his left arm at the shoulder, when about fourteen years old, and the left leg above the knee at the age of seventeen, and the last accident when twenty-two years of age, and the last time I heard of him, which was only a few months ago, he had performed an operation on himself, just below the chin and both ears, the result of which I have not heard, but presume he got well as he did in all former operations.

As to the different kinds of amputations, the operator may select the circular, or oval, or flap, or posterior flap, and anterior circular or oval, or the reverse, as in Teal's method, as in his judgment appears to be the most suitable. As to preference, it is apparent the location has much to do with it. Above the ankle or wrist, or above the elbow, except at the shoulder, the circular or oval, and below the knee or mid-



dle of the leg, a posterior flap and anterior circular or oval, or the reverse anterior flap and posterior circular or oval, and above the knee and at the shoulder the flap or oval method. Yet all operators or surgeons have their peculiar notions as to what kind of amputation is the best, and at the same time to secure the great object of free drainage. I have been successful in all these methods, except the anterior flap and posterior circular, which I have not used.

The ligatures ought not to be too large, so as to prevent them remaining too long, as they are a constant source of irritation; therefore, a small silk ligature is much more preferable, as when drawn sufficiently tight in the ligation of an artery, they will slough off quickly, and can usually be removed in ten or twelve days, while a large ligature is often attended with much trouble in their removal, and often remaining from six, to ten and twelve weeks, and sometimes have to leave them to Nature to be absorbed, causing great annoyance to the patient as well as surgeon. Yet to obviate the necessity of their removal, and to more securely obtain union by the first intention, torsion may be used instead of the ligatures, which can be done by grasping the end of the artery with the artery forceps, and drawing it out so as to grasp the artery with another pair of forceps, about two inches from its end, holding it securely, when the forceps grasping the end should be turned sufficiently, twisting and lacerating the internal coats of the artery, when it will retract, thereby arresting the hemorrhage. It can be done safely, more especially in the small arteries; in the large arteries I have never used it. As soon as the ligatures are applied, or torsion used sufficiently to check the hemorrhage, and the serum begins to flow freely, the flaps should be thoroughly cleansed of clotted blood, by triturating water, impregnated with an antiseptic material of some kind on them, as carbolic acid, salicylic acid or thymic acid, and then drawn together, and the interrupted suture applied about two inches apart, and supported between the sutures with strips of adhesive plaster, thereby drawing the edges of the flaps together securely, yet leaving an opening at the internal or external angle of the flaps large enough to have free drainage, and to more securely obtain free drainage the tent or drainage tube should be used; yet I have obtained good results without either, but it is not in every case it can be done.

As to the treatment, there are a diversity of opinions, but it is ap-

parent to all that more skill and judgment is required in the treatment than any other part of the management of these injuries. In former years, as during the late war, and for ought I know, with some surgeons of the present day, the simple water dressing, impregnated with some antiseptic material, was the most favorable dressing; while it is simple, cleanly and convenient, yet it does not, in my judgment, secure the most desired results—that of union by the first intention. Still, union by the first intention seldom, if ever, may be looked for in all parts of the stump. Under the most favorable circumstances and treatment, usually some constitutional measures are required to combat or prevent inflammation, as free evacuation of the bowels, with a saline cathartic, and followed with febrifuge mixtures in some cases. A dressing composed of cosmoline and paraffine, impregnated with an antiseptic, as carbolic, thymic, or salicylic acids, which is impervious to the atmosphere, securing the stump from the deleterious effects of any low organisms that contaminate the atmosphere, will secure better results, with less trouble or inconvenience, than any other dressing used, unless it be the antiseptic mode of treatment, which this is a part. The dressing should not be disturbed or removed oftener than the sutures, but if suppuration takes place and the character of the pus unhealthy, which is quite frequently the case, the pus being bloody and offensive, the stump will require dressing quite often, and all effort to obtain union by the first intention should be abandoned, and to secure a free exit of the pus keep the opening for drainage at the external or internal angle of the flaps open fully to prevent the accumulation of pus in the stump.

The most favorable and happy results are said to be obtained—that of union by the first intention throughout the stump—by what is called the antiseptic mode of treatment. The amputation, ligation of the arteries or torsion of the arteries, and dressing the stump, to be performed under a spray of carbolic acid or other antiseptic material. the instruments, ligatures and dressings used rendered antiseptic and dressing impervious to the atmosphere, securing the stump from the deleterious effects of any substance or of the lower organisms that may pervade the atmosphere, calculated to prevent union by first intention.

This is a mode of treatment I know very little about, not having used it in any case. It is apparent that it requires great care in its application, or else it terminates in a fatal failure. Yet, when the sur-

geon has all the conveniences necessary for the performance of such an operation, and circumstances favorable to its success, he can, with the reputation it has and rationality of the treatment, use it, feeling confident of the most happy results; but when an amputation has to be performed without delay, any then remote from any of the conveniences essential to its success, it is apparent to all that the application of this treatment cannot be made only when convenient to do so, but the use of antiseptics in amputations that I have performed, as herein stated, except the spray, has been the means of obtaining the most desired results.

Mr. President and Gentlemen: While my subject may be somewhat disconnected, and I may not have advanced anything new to you, yet it may be the means of bringing out a discussion that will be beneficial to all here.



*The Deceptive Character of Railroad Injuries.* By Z. E. PATERICK, M. D., of Sheldon, Ill.

Considering the fact that we have in this country about 75,000 miles of railroad in operation, and the fact that a great many employes and others are injured by the cars every year, and also the fact that every one engaged in the practice of medicine in the 9,000 or 10,000 cities and villages situated upon these railroads, are liable to be called upon at any moment, to treat the most desperate of all wounds, it is rather surprising that, so far as I know, there is no treatise devoted entirely to railroad surgery. The effects of railroad injuries, both local and general, are so entirely different from wounds resultant from any other cause, that it seems to me such a work is demanded.

Given, an accident happening to a man on the farm, in the workshop, or on the road; and as near as may be the same accident happening on the railroad, and my experience has taught me to be very much more reserved in my promises to the man injured by the cars.

I think the unstable-here-to-day-there-to-morrow life of a railroad man has something to do with the tediousness of his recovery after injury, or, as sometimes happens, with his swift and unexpected death. None of us need to be told that regular hours, regular meals, and



temperance in all things conduce to health and a rugged vitality. A vitality sufficient for the repair of extensive wounds, and a courage to endure the pain, confinement, and exhaustion entailed by them. To the surgeon's experience is mainly due his skill, and it is well known that he whose experience has been confined to other than railroad surgery, will be very apt to form an erroneous opinion on the first cases that fall to his care. I may as well say that this is in the nature of a confession, for I found it so in the first case of magnitude which came under my care. I did not properly take into account this lack of balance of the vital forces, nor the tremendous energy which produced the wound, and in attempting a feat of so-called conservative surgery, was defeated by blood poisoning and death.

However innocent the external surface of an injured member may appear, it is necessary before deciding as to diagnosis, prognosis or treatment, to learn every circumstance attainable as to the cause of the injury.

An ordinary freight car will weigh about 20,000 pounds, and when loaded the whole weight will be from twenty to thirty tons. I have seen a man's hand after it had been fairly caught between the draw-bars of two such cars, with only a bone or two broken, very little discoloration, the motion of nearly all the joints good, and in fact very little in appearance or feeling to indicate the havoc which had been wrought in the soft parts of the hand. In such cases we must "judge not from appearances but judge righteous judgment;" a judgment formed not only by the usual means of arriving at a conclusion, but also by taking into consideration the enormous force to which the member had been subjected.

A wound such as last described is exceedingly liable to induce septicæmia, or to take on an erysipelatous action, and as the surgeon would not be supported by the patient or his friends in performing amputation, or perhaps he is not entirely decided in his own mind as to the necessity of such a measure, everything must be done to assist Nature in her too often feeble efforts at repair, in this period of probation; the time between the reception of the injury and the time when the surgeon must decide what to do. And this decision must be arrived at as soon as possible.

Cleanliness is a measure of first importance, and it is said to be next to Godliness, but if a surgeon had formulated this aphorism I believe

the relationship between the words would have been reversed, and cleanliness would have been given the primary place. Other measures, such as warm fomentations, supporting treatment, etc., need not be mentioned, as they suggest themselves.

The reason that delay is so often necessary after railroad injuries, is, that the appearance of the wound does not declare its whole extent. I have been surprised to see, here and there about a wound, evidences of injury in parts which had certainly not been subject to direct violence. A blister will perhaps show itself first, and on pricking it a patch of dead tissue will be exposed beneath, or there will be an inflammatory process which will go on until death of tissue takes place. And this process of destruction will be at a considerable distance from the main seat of injury. I think it is to be accounted for by remembering the enormous pressure to which the parts have been subjected, and which has thrown the fluids of the part so violently backward along the only possible routes for them, viz: Between the tendons, muscles, skin, and connective tissue, as to so injure isolated spots as to place them beyond repair. In such cases I do not believe any effort to save will be successful, but think amputation should be performed as soon as possible.

Though the treatment for railroad injuries is about the same as for injuries from other causes, I think we should be much more prompt in operating, than for other kinds of wounds. That is, I think it is much safer to wait for an ordinary wound to declare its full extent than to wait for a railroad injury to do the same thing. In the latter case, about the time one has his mind made up as to what he will do, the patient slips through his fingers from traumatic erysipelas, pyæmia, or gangrene. Conservative surgery—so-called—cannot properly have a place in railroad surgery. In most cases of doubt, I think we should give the fragment a little more, the stump a little less, for if we do not, Nature will do it for us in nine cases out of ten, and will expose our patient to the greater dangers of gangrene, pyæmia, etc., than if the removals were promptly made by the surgeon's knife.

It is sometimes hard to report a case correctly. That is, to report a case just as it seems to you, and convey to the person for whom the report was intended a correct impression of its magnitude. I will close this paper with a case in point:

On the 13th of January I was called by telegraph to see a man in-

jured by the cars at Idaville, Ind. On arriving I found that the injury was to the left lower extremity. The skin was lacerated from the middle of the leg, on the front, to the middle of the thigh. Except the rent in the skin mentioned it was continuous everywhere, but around the leg it was detached from the connective tissue, and the hand could have been passed under the leg, between the skin and the muscles. The muscles of the leg were torn and badly crushed. The bones were not injured in any way. The joints were sound. The larger vessels were not involved, so far as I could tell, as there had been a surprisingly small amount of blood lost. I told the man he could not live unless he would submit to amputation. This he refused to do, so I did the leg up in a roller bandage, and sent him to his home in Peru, Indiana.

I reported the case to our chief surgeon, Dr. J. T. Woods, telling him I thought the man would die if his leg was not amputated; and shortly after I received a letter from him in regard to the case, which made me believe he thought amputation unnecessary in the case I had given him. I had written to Dr. Higgins, the Wabash surgeon at Peru, asking him to report to me how the man got along. On the same mail which brought Dr. Wood's letter I received my answer from Dr. Higgins, saying that the man was dead.

It seemed to me, with the case before me, that there was but one thing to do, and that was to amputate; but when it was transcribed to paper, which showed no bones injured, no joints, no periosteum, no large blood vessels involved, it did not seem so very bad an injury, and I had not made Dr. Woods comprehend its magnitude.

This was a deceptive case of railroad surgery, not to the surgeon on the spot, but to the one who has to form his opinion from reports. I do not think many surgeons would advise amputation in the same case if it came before them on paper, instead of in actual practice, and yet the man died within three days.

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*Suspension in the Treatment of Compound Fractures*, read before the meeting of the Surgeons of the Wabash, St. Louis & Pacific railroad, by JOSEPH POGUE, M. D., of Edwardsville, Ill.

I do not expect to say anything that will be new to you, on the system of suspension as it is now generally practiced by surgeons for the

treatment of compound comminuted fractures of the leg, but inasmuch as it is very largely the kind of injury that railroad surgeons have most to contend with, I wish to offer in evidence my unqualified approval of it as being, in my opinion, best adapted both as to the treatment and for the transportation of persons with such injuries.

At least, I have found nothing that has done as well for me, during an experience of twenty-five years. I have known a case of gun-shot wound of knee-joint, treated by suspension and a thorough antiphlogistic treatment, which recovered with ankylosis. But this case does not convey the plan of treatment I wish to get at. What I wish to say is, that in injuries of the lower extremities, particularly below the knee, I have had better success by suspensory, properly adjusted, than by any other method. I will first refer to a case of a little girl, of 7 or 8 years of age, who overslipped the sickle bar of a mowing machine, first cutting both Tibia and Fibula entirely off, an inch above the ankle joint; then doing the same two inches higher up; then as she fell forward upon her knee and face, the knife literally chewed upon the calf of her leg and thigh. Her physician sent for me to amputate. With my pocket knife and a buck saw I made a box with very high sides, and suspended her leg upon strips of bandages, with tacks. After having ligated the posterior tibial artery, I removed the two inches of loose bone. She recovered with a perfect ankle joint and with two and a half inches of shortening of leg.

My next is a case of a lady, aged 50 years, kicked by a horse, crushing the upper part of Tibia apparently pulverizing it, and involving the knee joint, there being escape of synovial fluid. The leg was first treated by Clark's Hodgen, but the iron splint for extension and counter-extension, pressing upon the thigh, made an abscess, and she, having become much debilitated, I made an iron rod for extension and counter-extension; a continuous one arching over the thigh to meet its fellow of the opposite side, thus preventing its coming together and wounding the thigh by pressure. I then hung this up by rods and pulleys of my own construction, to and over the roller or windlass of a Jenks fracture bed, thus enabling me to raise and lower both the body of my patient and leg together or singly, as I preferred. The leg was treated by carbolized oil. She made a good recovery, only troubled by a contracted ligamentum achilles, which I offered to cut by sub-cutaneous incision, but she is satisfied to let it remain as it is.



My next case, a railroad conductor of this road (Wabash, St. Louis & Pacific,) run over by a freight car, sustaining a compound comminuted fracture of the lower third of leg. Treated by Clark's Hodgen, with addition of rod already described; dressing of carbolized oil; result, a good recovery.

Another of a similar, but much graver character, run over by a box car in East St. Louis. It was then thought necessary to amputate, but wishing to get him to his home, he was sent to me with a note of advice to operate without delay. He was treated like the other, and is now fully recovered.

Thirty or less years ago amputation was the rule in such cases, and a conservative course would have been the exception. Now the reverse seemed to be the order of the day. Of the first surgery of the war I have but little respect. It seems to me that every one of us wished to try his maiden knife. It has even been said of us that the wrong leg was sometimes cut off. However, as the war progressed, it brought experience with it. Operating boards were formed, and system came out of chaos. In the upper extremity resection was the rule, but in the lower it did not work quite so well. At least that was our experience, but it might have been owing to the surroundings, making it difficult as to after treatment. But this objection does not prevail in civil life, and I see no reason why we could not save a very large per cent. of very grave cases of compound fracture of legs by suitable trimming up, antiseptic dressings, and a splint adapted to the peculiarities of each case. I mean by suitable trimming up of leg the resection of portions of shaft of bones, if necessary, removal of detached splinters incapable of being readjusted, and after ligating ruptured arteries and nicely-adjusted fragments, to place the leg upon a splint, such as I have described, and with the antiseptic dressing of carbolized oil I should expect a good recovery in a reasonable time.

The railroad splint of Clark & Hodgen's, with certain modifications, is the one that I know most of and like the best, both for treatment at home and for the purpose of sending my case to a distance, as it allows the movement of the body without deranging the adjustments of the leg. But anything that will keep the fragments of broken bone in tact, without pressure upon the same, that will allow the patient to sit up and lie down, and that can be carried, independent of the movements of the body, that can be hung to the ceiling of a car, or roof

of a wagon, nail or hook upon the wall, etc., with its addition of multiple pulleys, will fill the bill, in my estimation.

I like to hang my splint upon the roller or windlass of a fracture bed, so attached that it has all the advantage of both rail and pulleys to run over, and can be raised and lowered at will, and both leg and body can be raised or lowered together or separately. This is my usual plan, particularly if I have an old person, or expect much prostration. When I think the fragments are sufficiently adhered I apply a bandage of equal parts of chalk and gumarabic, making both a light and firm dressing. I also regard suspension in any condition in which we have inflammation, traumatic or otherwise, by no means to be despised as an adjunct to relieve turgidity.

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*Railroad Accidents to Hands and Feet.* Read before the meeting of the Wabash, St. Louis & Pacific Railroad Surgeons, at Fort Wayne, June 4, 1883, by FREDERICK COLE, M. D., El Paso, Ill.

Perhaps no class of injuries are more numerous than injuries to hands and feet from railroad accidents. The many railroads of our country, crossing and recrossing all portions of our land, give employment to a large class of men who are subjected to much danger, especially the train-men whose business it is to be about the moving cars. In my observations and experience for the last fifteen years, I find a much greater number of railroad accidents to be of the hands and feet than any other parts of the body. This is obvious from the very nature of the occupation—coupling cars; for the least mistake in stepping or movement of the hands, may be productive of the most serious consequences. One would think, from the extensive railroad systems of Europe and America, the thousands of railroad accidents occurring daily, and the peculiar contused wounds from these accidents—while conservative surgery reaps its highest rewards in the special line of saving hands and feet—that some monograph on railroad accidents would, by this time, have appeared. I am not aware that any writer has yet attempted to venture to collate, classify, or even to describe, as a separate class, contused wounds from railroad accidents. I have failed to find any national or inter-

national systematic work on surgery, any more than a mere mention of railroad accidents, and then only enumerating them with gun-shot wounds, or ordinary wounds from machinery.

No class of injuries can be more profound than those that follow the catching of a hand between the "bumpers," or the passage of the wheel of a railroad car over the foot. Of course, in the severer forms of these accidents, where the parts are mangled in a frightful manner, the soft parts completely pulped and the bones ground up, I need spend no time in pointing out the indications, especially to a class of surgeons as are represented in this body. But many of these limbs, with proper and judicious treatment, which, at first inspection, would seem almost beyond hope of saving, can be saved and made useful. But to determine how much can be saved, or whether it is best to amputate, and to what extent, largely depends on the experience and good judgment of the surgeon. No man can sit down and "read up" on a railroad accident and mark out a proper line to follow in the amputation of a hand or foot. A correct decision of these cases calls out the experience and sound judgment, based on the anatomy of the parts. I would make this a rule: Where, after a full and careful examination, the hand or foot proper, is injured, and you have a doubt of the propriety of amputation, then give the patient the benefit of the doubt.

These two extremities are so far from the vital organs that, under proper antiseptic dressings, fear need not be entertained that nature will not soon indicate what she can do at restoration.

Should amputation not be decided on (and allow me to say the injury to the hand or foot must be very profound which would warrant a primary amputation), then the question of how to dress the limb to get the best result will occupy the first place in the mind of the surgeon.

Without deciding the best method we can only give our's, and as we have seen results which will warrant us in continuing this method as long as it promises, in the future, what it has done in the past:

First. We never expect in railroad accidents—contused or lacerated wounds—of hands and feet, "to get union by first intention." We believe any surgeon who completely seals up the wounds of this nature, with the expectation of that result, will be doomed to disappointment. I am aware that much is said by both English and

American surgeons to-day about dressing all lesions with a view of healing them by "first intention." No one appreciates that method more highly in certain kinds of lesions than myself; but would never attempt it in contused and lacerated wounds from railroad accidents. I would even go further, and say, I would consider it a dangerous method.

Then, in injuries of the hand or foot, where the deeper structures are involved, where the injury has been so severe as to crush the soft parts, and even to fracture the bones—causing much deformity—I would readjust the soft parts, shaping the hand or foot the best possible—remembering the natural arches and articulations—then dress the whole hand or foot by enveloping it with some material which will allow the soft parts to swell; or, in short, give the tissues the greatest possible latitude during the high inflammatory condition of the part. To this end I have used several kinds of material. First—Manila rope. Second—Southern moss; such as the upholsterers use in making lounges and cushions. Third—"Excelsior," or the fine shavings now used to pack goods in. Take either of these articles and wrap the limb in it; wrap it quite deeply, so as to allow perfect latitude in the swelling and œdema of the parts; then I apply carbolized water to the wrapped limb till the high inflammatory action passes away, opening the limb daily to see that the proper shape is maintained and that proper drainage is kept up.

Now, gentlemen, the question of temperature—as to how high or how low the limb should be kept—may, with much propriety, be raised in your minds. I regard this a very important question, and one worthy of our consideration. It is a question, in a clinical point of view, in which many surgeons differ. If I were to state a rule for temperature of water which I have always used by irrigation I would say commence at 60 Fah., and raise as the feelings of the patient would indicate to be the most agreeable. However, I would say, if the lesion was followed by marked reaction, with high vascular excitement, I would lower the temperature even much lower than 60 deg.—to correspond to any demand for antiphlogistic impressions. Then in short, I would always use such a degree of temperature *as each individual case seemed to demand*. In an excessive reaction of vascular excitement, then use the low temperature; but in a class of cases where reaction is incomplete, or a tendency to asthenia, I would use



an irrigation of a higher temperature, and if necessary *put some stimulating spirits in it*. Now there can be no absolute rule laid down how high or how low in temperature water should be used ; it demands as much judgment and caution as many other remedial agents and should be administered with as much care as opium.

Prof. N. B. Crosby and Prof. Frank H. Hamilton, of New York, are advocates of warm water. The former says : "An elevated temperature in the water proves a marked advantage when the vitality is low. The rule of lacerated and contused wounds is to slough to a greater or less extent. The separation of the slough is dependent on cell-infiltration, or the formation of granulation, and this is retarded by cold and aided by heat, and the more rapidly will adhesive inflammation be set up, and insure the immediate safety of the patient by plugging the capillary vessels and closing the lymphatics."

The next most important agent in the surgical treatment of this class of injuries is *free drainage*. This especially in severe contusions of the deeper structure of the hand and foot. There is a great tendency to pus formation, which, if it does not get vent, will burrow through the cellular tissue, preventing not only adhesive inflammation, but destroying the bones as well as the soft tissues. To this end I would seek to give drainage the moment pus formation takes place. Open for matter where you have good evidence it is ; if you err at all, err in the right direction. Open in the most dependent part, avoiding nerves and arteries. Make the incisions free and keep them open with drainage tubes or twisted oakum, removing them daily and syringing the parts out with slightly carbolized water. When drainage is fully established there will be as marked improvement in the parts as our farmers experience in the drainage of their low, wet lands.

Then, in short, I would say in carrying out the treatment of railroad wounds of the hands and feet : First, where the lesion is profound but not so severe as to warrant amputation, exclude all germs of putrefaction ; then immediately provide for a free escape of secretions—especially pus.

In pursuing the above plan of treatment, I have seen results for the last thirteen years which may well be regarded triumphs of conservative surgery.

A few cases from my note book will suffice to illustrate :

CASE I.—Was called June 29, 1873, to see a boy aged fourteen who

attempted to jump on a moving train of cars, but slipped and the truck ran over his left foot—denuding the whole top of the foot of all the soft tissues, fracturing the metatarsal bones, and partially destroying the arch of the foot. When I arrived a physician had already preceded me and made preparations to amputate the foot. The parents of the boy were in great distress of mind, and after a casual examination of the foot I became convinced that it could be saved, and so informed the parents, who gave the case into my hands. I prepared a pound of basilicon ointment by adding about two per cent. of carbolic acid, and with a wide camel's hair brush spread the ointment all over the foot, adding layer upon layer of the ointment while melted, till there was a coating of ointment at least one-eighth of an inch thick, then wrapping it in southern moss and suspending a bucket of water over it with a siphon attached to keep up a constant moisture—the water being carried away by an oil-cloth to a tub under the bed. This foot was dressed daily by removing the basilicon ointment and painting on new, and the water was kept up constantly till the high inflammatory action ceased, then the ointment was continued. In about seven days the new granulations could be seen shooting up. Great care was exercised in dressing the foot not to disturb the reparative process, but to exclude the air as much as possible from the granulating surface. A small per cent. of carbolic acid was added to the water. The temperature of the water was at first about 60 deg. Fah., but it was gradually raised as the high inflammatory action lessened. This foot was saved without any bad symptoms, and though the arch of the foot looks a little flattened, the boy (now grown to be a man) walks with but a slight deviation from a natural gait.

CASE II.—In 1874, a brakeman on the T., P. & W. railway—now Wabash, St. Louis & Pacific—met with a severe accident of his right hand in coupling cars. The accident occurred some sixty miles from his home. El Paso, Ill. Three of his fingers seemed completely crushed, each of the bones were broken. The surgeon at the place, so he alleged, where the accident occurred, informed him that the fingers must be amputated, but the brakeman would not consent, and immediately took the train for home. On arriving he presented himself to me for treatment. I found the three fingers, first, second and third, so completely broken and contused that a peculiar splint had to be devised in order to keep them in proper shape. This splint consisted

of a thin piece of cedar wood, cut with fingers to it, so as to dress each finger separately. Then the hand was wrapped in manila (the fiber of the common manila rope), the whole enveloped with thin muslin; then the hand was kept constantly wet with carbolized water for several days. After about a week the fingers were dressed in a semi-flexed position; and as the reparative process went on the joints were moved at different angles at each dressing, till he was instructed to make passive motion daily. It would surprise any one who could have seen this hand when injured, to now see it as he collects fare on the cars—for he is now a conductor. There is but little deformity, and only the sheaths of one of the flexor tendons of the forefinger are adhered so as not to give perfect flexion in the movement of the finger.

CASE III.—I was called, October 15, 1881, to see Mr. C——, a young man eighteen years of age, whose foot had been run over by the truck of a gravel train. He had on at the time a thick cow-hide shoe. The flange of the wheel struck the heel of the shoe on the outside and passed obliquely across the foot from behind forward. The impression of the flange could be seen plainly marked on the shoe as it tore off the heel and passed across the instep. The young man was brought to his home, some eight miles distant from where the accident occurred. The foot was badly contused and swollen, but the arch seemed not crushed. From the examination of the shoe, I felt that the ankle joint had not received injury enough to destroy it, and the foot was immediately wrapped, or enveloped, in "excelsior," passing a loose roller around to retain it in position. The foot was kept constantly wet in water at a little less temperature than itself for about five days. At the end of this time it could be plainly seen that all inflammatory action had reached its height, in fact the skin began to show that peculiar wrinkled look, indicating reduced swelling. The foot was wet from this time on only occasionally, but the temperature of the water was gradually raised to that of the body. In about five weeks this young man could sit up, and in two months he could walk on crutches. The foot made a good recovery, and with no deformity.

I ascribe the good result in this case to the loose dressing, allowing the tissues of the whole foot plenty of room; then the "excelsior" not only aided in this, but allowed free evaporation at the proper tempera-

ture, thereby controlling the circulation so as not to aid in too rapid tissue change.

CASE IV.—\* I was called, March 8th, 1870, to see D. H——, a young man aged eighteen, who, in attempting to jump on a freight train while in motion, slipped and his left foot was caught between the wheel and rail, the wheel catching the heel of his boot on the outer side, tearing it from the sole, and passing over the tarsus, crushing and destroying the arch of the foot. The first man who reached him, Mr. Hotchkiss, declared that the young man's ankle was dislocated, and that he "pulled it in place."

I saw the young man some three hours after the accident, at his own home, whither he had been brought in a wagon two miles from the place of the accident. The foot was swollen so badly it was difficult to diagnose the extent of the injury. But from a close examination of the foot, and learning the position in which he attempted to jump; also observing the bursting of the soft parts in the hollow of the foot opposite the tarso-metatarsal articulation of the great toe, it was supposed that the tarsal bones were dislocated and crushed, as well as the metatarsal. But believing the ankle joint had received no serious injury, I thought an attempt to save the foot entire worthy of trial, trusting to amputation in case the joint became involved. The wound in the lower part of the foot was closed with sutures, the foot shaped, or molded back to the arched form, and completely enveloped in southern moss—such as is used by upholsterers—and a roller passed loosely around the whole. The mass of moss was to be kept wet with ice water and carbolic acid (one of acid to ten of water). Morphine was given for sleep and to quiet pain. March 9th he was suffering but little; pulse 100; foot much more swollen, extending up the leg; the treatment was continued. In about six days there was some sloughing of the dorsum of the foot, and the wound upon the under surface opened from the severe swelling.

It now became apparent that there would be necrosis of the tarsal and metatarsal bones. But not being desirous to be meddlesome, I waited till there was a peculiar puffiness of the soft parts, with increased pain before I explored for loose bones. In fact a small sinus had appeared near the wound opposite the tarso-metatarsal articulation of the great toe. This sinus was explored, using a silver female cath-

\*—This case was reported in the transactions of the Illinois State Medical Society for 1880.



eter for a probe, and it was passed into the interior of the foot in many directions.

The sinus was then enlarged, and a piece of necrosed bone removed with the dressing forceps. A large tent of the oakum was twisted and pushed into the interior of the foot, after having been soaked in a solution of carbolic acid. This tent to be removed twice daily, and the foot, through this sinus, to be injected with suds of castile soap—using several quarts at a time—with a Davidson syringe. Each time after using the suds the carbolic acid and water, as used externally, was injected. Meanwhile the carbolized moss, as an external envelope, was continued.

Several sinuses formed, but at each visit, once in two or three days, they were explored for loose bones, and tents of oakum, soaked in carbolized water, were pushed into each. In this way the crushed and necrosed bones were removed early, and pus was not allowed to accumulate. In short, the foot was kept under perfect drainage with the oakum tents and injections, while the temperature was kept low with the moss and iced carbolized water.\* Many pieces of necrosed bone were removed with the forceps. The ankle joint did not become involved; and though at one time his constitution seemed to yield, yet under a tonic of quinine and iron, a generous diet and stimulants, he rallied. In a few weeks he was able to be drawn to the door to inhale pure air. It is impossible to give the exact date when he entered upon duty; but in the following August, five months from the date of the injury, he followed a threshing machine, and “made a hand.” His foot made a good recovery, though it looks somewhat flattened, the arch having been destroyed. No defect in his walk is noticed, except only by those conversant with his injury.

In the above cases of conservative surgery, I relied on two important means, viz.: *Antiseptic Dressings* and *Drainage*. And by drainage I mean the removal of necrosed bones at an early hour, as well as pus. At this time (case IV.) I was not conversant with Prof. Lister’s antiseptic method, nor do I at the present time think it necessary, in order to reach good results, that the surgeon must be armed with an extensive apparatus, requiring a method full of minutiae. While there can be but little doubt as to the correct theory of Lister’s method, and

\*—Though this case occurred in 1870, before the advocacy of warm water, yet in this particular case, where high vascular excitement supervened, we believe the best result was obtained with a low temperature.

even its fastidious details may be requisite for the best results in some cases, yet no surgeon should despair, with less complicated instruments, of reaching good and great results. To this end we should not discard the means and methods of Spence, Watson and Balfour, of Edinburg; Callendar, Hutchinson and Kirkland, of London; Soulez, Demarguay, Lemaire and Comusat, of France; Munnich, of Venice; as well as Dr. Lewis D. Mason, and others, of our own country.

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*Relief of Shock and the Induction of Rapid Anæsthesia.* Read at the meeting of the Surgeons of the Wabash, St. Louis and Pacific Railway, at Fort Wayne, by C. V. ROCKWELL, M. D., of Taylorsville, Ills., June 4.

*Mr. President and Gentlemen:*

I propose very briefly to give my experience and observation as to the best method of relieving shock and of inducing rapid anæsthesia. In cases of shock, unless very profound, I seldom find it necessary to administer alcoholic stimulants. But almost invariably I commence the treatment by the use of 1-120 grain of atropine, given by hypodermic injection, and if necessary repeat the dose in from ten to twenty minutes. In many cases, when prostration is not very great, reaction will follow quite promptly one or two doses given in this way; but should it not do so, I increase the dose of atropine to 1-60 of a grain and administer by the stomach frequent doses of aromatic spirits of ammonia.

So soon as reaction is fairly begun, from 1-6 to  $\frac{1}{4}$  of a grain of morphia, by hypodermic injection, will relieve the increasing pain, and in from twenty to thirty minutes put the patient in the most favorable condition for the induction of anæsthesia from chloroform. By this mixed method insensibility is more rapidly produced and less chloroform is required; consequently danger to the patient is somewhat lessened.

The stage of excitement which usually follows the inhalation of chloroform is greatly abridged, or entirely prevented by the preliminary use of atropine and morphine. This is certainly a very great advantage. Some physicians complain of the prolonged and dangerous

stupor following the combined use of morphine and chloroform. But in my hands mixed anæsthesia, resulting from the administration of small doses of atropine, morphine and chloroform, has never been unduly prolonged ; nor has it, to me, seemed dangerous.

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*Traumatic Tetanus from Railroad Injuries.* Read at the meeting of the Surgeons of the Wabash, St. Louis & Pacific Railway, at Fort Wayne, June 4, by F. W. BEARD, M. D., Vincennes, Ind.

Was called to see Mr. E. A. German, age about 30 years, who had received a railroad injury by falling from the pilot, the wheel of the engine passing over the end of the right foot and toes, which were somewhat protected by a heavy box-toed shoe. I saw him about half an hour after the accident. There was a lacerated wound on the plantar surface of the foot, at the metacarpo phalangeal articulation of the great and second toes, but the bones and articulations were not injured. The soft parts on the upper side of the great toe were torn opposite the articulation of last phalanx, and with the nail stripped off and hanging beneath. The bone was left bare, with the exception of the periosteum, which appeared to be uninjured. There was a lacerated slit extending down the inner side of the great toe, as far as the end of the metatarsal bone. The bone and periosteum not being injured, and the soft parts not so much bruised as to entirely destroy the vitality, I placed the skin back over the bone with the nail on, carefully adjusted the edges and secured them with strips of adhesive plaster. The other toes were bruised and lacerated, but not enough to justify amputation. They were dressed with isinglass plaster, lint and cold water. There was not as much inflammation following as is usually the case after injuries of this kind. The greater portion of the lacerations united by adhesion, and in every particular the case progressed in a manner unusually favorable.

On the third day he was sitting up and keeping the check-books for the company. The wounds that had not united were cleansed every day with warm water, soap, carbolic acid and permanganate of potash, and dressed with resin cerate.

On the morning of the 20th, this being the ninth day from the

date of injury, he began to complain of stiffness of the jaws, also pain and stiffness in the posterior cervical muscles; was unable to open the mouth farther than half an inch; he could open it freely that far, but it would then stop suddenly, as if striking against something solid, and all efforts to move it a particle farther were futile. I found the end of the second toe becoming sphacelated; this I removed by amputation, and dressed it with permanganate of potash and a linseed poultice. Ordered morphine to be given in one grain doses; quinine in five grain doses; stimulants, mostly wine, beef soup, milk and eggs, all that he could possibly be induced to take. The eggs were given raw, being broken up with the milk. He was kept on this treatment throughout the entire case. The morphine would give him sleep and ease the pains somewhat, but did not relax the tetanic spasms which continued to extend until the 25th, which was the fifth day from beginning of tetanus, at which time he presented a typical case of tetanus of the opisthotonos variety. *Risus sardonicus* well marked; bowels constipated, could not be moved only by injections; urine retained; abdominal muscles hard as a board; was constantly bathed in a profuse perspiration; mouth closed, the tetanic spasms continuing with scarcely any perceivable remissions; *decubitus dorsal*. It now took three large pillows to fill the space between the back and bed.

A small portion of the laceration at the outer side of the great toe had not healed, and was suppurating freely. The periosteum of that side of the phalanx had sloughed away, and the bone was becoming carious. Dr. Jessups called with me on the 25th, and suggested resection of the bone, which I did on the following day by dis-articulating at the last joint, and removing the phalanx entire. In this operation I was kindly assisted by Dr. Bever, who administered chloroform. And here let me remark, for the benefit of those who advocate the chloroform treatment, that, though the anæsthesia was perfect, it did not relax the spasm of the muscles a particle. The wound was drawn together with isinglass straps and dressed with lint, soaked in a solution of chlorinated soda, and covered with oiled silk. After the operation there was no abatement of symptoms, but continued gradually to grow a little worse until the 30th, this being the nineteenth day from receipt of the injury and the tenth from the first symptoms of trismus. At this time the muscles began to relax; first, the masseter and cervical, those of the hamstrings next, and the



trunkal muscles last. There was a gradual abatement of all the symptoms until February 5, at which time he was almost free from cramps. The wound had healed kindly and he was able to be up.

I did not give the morphine and quinine with a view of any specific effect. The morphine was given to relieve pain and produce sleep. It acted well, and was therefore continued. The quinine was given for its antipyretic effect and its well-known action on the nervous system. Its supporting and tonic properties, particularly to increase and maintain vital affinity. I gave the wine in preference to other stimulants because he liked it, and procured a good article of the catawba. Of this he took a bottle daily. I do not wish to weary your patience by giving a detail of the daily notes in this case, which I call a typical case of traumatic tetanus, but I have given only a synopsis that I might give in a more practical manner my ideas of the most successful treatment of this disease.

Tetanus appears to have been known to the ancients, and this name never was used as a generic term to include several varieties. Any one who will take the pains to search the literature on this disease, will be surprised to see what little progress is made in the pathology, natural history and treatment of this one of the most frightful and fatal of all the ills to which human flesh is heir. Tetanus has from time immemorial been one of the bug-bears of the profession, and the traumatic variety the surgeon's terror.

The symptomatology and clinical history were studied and well understood by the early medical writers, but they knew nothing of the pathology, and their treatment was unsuccessful. The pathology is yet merely hypothetical, and the treatment has always been empirical, and but little less than a series of failures. This sad state of affairs may be, to some extent, accounted for from the fact that the study of pathology has been neglected in a mad race for specifics. There is scarcely an article in our vast *Materia Medica* that has not at some time or other been lauded for its virtues, or claimed *par excellence* as the remedy in its treatment. Among the numerous remedies which have been actually employed there may be mentioned: Cathartics, especially calomel, castor-oil and turpentine; colchicum, camphor, tobacco, with nearly all of the antispasmodics and sedatives; cannabis Indica, alkalies, opium in some of its forms, aconite, calabar bean, ice, chloral, woorara, tonics, stimulants, chloroform, ether, bromide of potash,

counter irritants and moxa to the spine, warm baths, especially the Russian. All of these have at one time or another been held in popular favor, but failed in the crucible of experience. By far the largest mass of testimony has accumulated in favor of nutritious food, tonics, stimulants and opiates. Chloroform was most in favor with the surgeons during the late war, and almost invariably used, but not with such success as to warrant its continuance. It also seems to have been the most favorable remedy in a number of cases analyzed by Dr. Yandall, of Louisville. And Prof. W. H. Hammond has a preference for it, and ice to the spine. While on the other hand, Frank Hamilton declares that it appears to cut short the disease only by causing a more speedy terminatinn in death. In short, he says that it is likely in itself to kill the patient before the nervous lesion has had time to cease.

There were 363 cases of traumatic tetanus reported to the Medical Bureau at Washington, during the late war, of which 336 terminated fatally. Of the twenty-seven recoveries, twenty-three were of a chronic character, which would leave but four recoveries from the acute variety. And it is probable that these were merely cases of trismus.

Dr. Gross, at the time of writing his work on surgery, had seen but two recoveries. I find that he has reported a case since that time. Dr. Frank Hamilton, with his vast experience, has witnessed five recoveries, but one of which was of a decided acute character. Dr. O'Burne witnessed 200 cases in the Peninsular war, with not a single recovery- Dr. Hermen, who seems to have studied this disease very thoroughly, never saw a case of recovery from acute traumatic tetanus. Dr. McLeod collected twenty-three cases which occurred in the British army, in the Crimea, of which two recovered. Demme refers to eighty-six cases in the hospitals in Italy during the campaign of 1859, of which six were cured. But he does not say whether they were acute, chronic or merely trismus. The shortest case on record is one observed by Prof. Robinson, of Edinburg, quoted by Hammond. The patient, a negro waiter, cut his finger with a piece of broken china. He was immediately seized with tetanus and died in fifteen minutes. Mr. Poland quotes a case in which death took place in five hours. In a case cited by Lepelletier, death took place in a few hours. In one by Dr. Jackson in twelve; in one by Dr. Keith in eighteen, and in one ob-

served by Mr. Carling in nineteen hours. The average duration of fatal cases is from three to twelve days; though several cases are on record which lingered several weeks, and finally terminated in death. But recovery is the rule in cases that have lasted till the fifteenth or sixteenth day. Notwithstanding post mortem examinations have generally given negative results, there is abundant evidence in support of the hypothesis that the seat of this disease is located in the gray matter of the spinal cord. And that it is not inflammation, as was at one time supposed, but an irritation caused by an intense degree of excitement into which it is thrown by the action of the motor nerves. Just what this irritation is the pathologists have left us in the fog. However, experience has established the fact that there is no known remedy for this condition. That violent cases will die under any treatment, and in any case, the only hope is in removing all known sources of irritation, relieving the pain and spasms so far as possible and supporting the power of life until this irritation has exhausted itself, which it will do in the great majority of cases in about twelve to fifteen days.

I have no faith whatever in antispasmodics or any of the specifics that are recommended by medical writers, and but very little patience with practitioners who are continually crowding their patients with these drugs to the detriment of the stomach, strength, and often the life of the patient.

In violent cases I would give anæsthetics, the best of which is chloroform. But not with the idea of curing the case, but merely to smooth the path from time to eternity.

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### *SHOCK IN RAILWAY INJURIES.*

By C. B. HIGGINS, M. D., Peru, Ind.

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The subject I have chosen in this paper is "Shock in Railway Injuries." Injuries of this character, owing to the manner of their infliction, are seldom complicated by the occurrence of hemorrhage. I shall, therefore, confine my attention to shock, as manifested immediately after the reception of the wound, ignoring that condition occasioned by loss of blood which so closely resembles shock in its symptoms, but which treatment demonstrates to be of an entirely

different nature. Neither will I consider the remote manifestations of shock, but leave that branch of the subject to the neurologists.

Our chief, in indicating his approval of the subject I have selected, expressed a desire that I should exhaust the theme. Upon a topic so trite as the one under consideration it would be presumption on my part to claim knowledge not in possession of all observant and reading surgeons, and an exhaustive article would prove so tedious and commonplace as to excite a wish in the minds of my hearers that I had remained silent. I will attempt nothing further on this occasion than to approve the views of former writers in relation to the cause and treatment of shock so far as they are sustained by my own experience.

With the exception of burns and scalds railway injuries are attended with greater fatality than accompanies wounds received in any other way. It is generally conceded by surgeons that the cause of the unusual mortality following lesions of this character is due to the fact that in a majority of the cases the shock is in intensity out of all proportion to the injury received. Most writers on this subject fail to give sufficient prominence to physical influences in considering its etiology. In my opinion, mental impressions are the chief, if not sole, elements to be considered in connection with the cause of the intense degree of shock we so often observe following railway accidents.

Not long ago I was called upon to visit a young man who had fallen in front of his engine and received a crushed leg; there was no other injury, yet he died in less than three hours after the receipt of the hurt, of shock. I am confident that in his case death would have resulted had there been no bodily injury. The terror induced by the contemplation of the consequences of the fall was sufficient in his case to produce a state of mental depression from which it was impossible to recover. This young man was a perfect specimen of physical manhood—aged twenty-five, of sanguine temperament and guilty of no excesses.

Shortly after the occurrence just reported, I was summoned to see an old man of seventy-two who, while in an oblivious state of intoxication, had been run down by an engine and received a wound to all appearances as serious as the one occurring in the case previously mentioned. In the latter case there was no evidence of shock, and the patient was so thoroughly under the influence of liquor that the leg was amputated in twenty minutes after the infliction of the wound, without the admin-



istration of any *other* anæsthetic. The patient made a rapid and perfect recovery.

It is not my wish to have it understood that I have drawn my conclusions from the observation of the two cases reported, for I could cite a number, all tending in the same direction ; in fact all my experience as a surgeon leads to the conviction that when a wound is inflicted without warning, the attending shock is generally of little consequence. I have never witnessed an extreme degree of shock occurring in a person who had been injured while in a state of intoxication. How often do we hear the remark in reference to an intoxicated person who has survived some serious accident, “ had he been sober it would have killed him.”

I will relate my experience in another case to further strengthen my position. An insane spinster, aged thirty-eight, eluded her attendants and threw herself in front of a moving train, receiving injuries which necessitated the amputation of both legs. In her case, there was no hemorrhage and no shock. When freed from the influence of the anæsthetic, after the completion of the operation, she was found to be in possession of her right mind and has so remained ever since. She speedily recovered from the effects of the accident without the occurrence of an unfavorable symptom.

Entertaining the views I do in relation to the cause of shock, my treatment would naturally be directed toward securing a state of mind as little influenced by fright as possible. Professor John C. Dalton, in his work on Physiology, when speaking of shock, says : “ It is only after nervous irritability has been restored by repose that voluntary motion and sensation are re-established.” It would be well for us in the treatment of shock, such as we meet with in railway practice, to keep this statement well in the foreground and govern our efforts to secure reaction accordingly. Many patients have been thrown into a condition of more profound collapse by the too vigorous application of so-called restoratives, who if left to themselves in seclusion and quietude, would have recovered.

It is of the first importance to remove the patient, as soon as possible, from the scene of the accident, to prevent his being surrounded by the curious crowds that are sure to congregate upon occasions of this kind. The remarks made by thoughtless and ignorant people in the hearing of the victim, in reference to the serious nature

of the injury, add greatly to his depression and lessen his chances for recovery. He should be conveyed to a well-ventilated apartment, and only such persons admitted to the room as may be necessary to properly care for him. The surgeon and attendants should make every effort to conceal their anxiety; for the apparently lifeless patient is often possessed of sufficient vitality to comprehend his surroundings.

It will generally be found that the victim has been liberally dosed with whisky or brandy before the arrival of the surgeon. I wish here to express my unqualified approval of the position taken by the late Dr. John T. Hodgen, at the meeting of the American Medical Association in 1873, in reference to the administration of alcoholic stimulants in the treatment of shock. When the stomach is sufficiently active in these cases (which is not often) to allow of their being appropriated, they are no good. It frequently happens that when re-action is secured, the stomach is full of the alcohol, and the assimilative function being re-established, the stimulant is rapidly appropriated and we soon have a condition to contend with which is as dangerous and fully as difficult to overcome as the original trouble.

As before remarked, the chief object in the treatment of shock is to secure repose. This is best accomplished by the hypodermic administration of morphine, and in these cases it will be found necessary to use more than the ordinary dose to obtain the desired effect. If from any cause morphine should be contraindicated, ether may be administered hypodermically in drachm doses, frequently repeated. In addition to this treatment, attempts should be made to restore the temperature of the body to the normal standard by the application of dry heat. These applications should be made with as little disturbance to the patient as possible. The practice so frequently resorted to of applying cloths wrung out of hot liquids of various kinds, owing to the rapid evaporation, has an effect just the opposite from that intended. The use of mustard plasters, friction, electricity, etc., etc., I shall mention only to disapprove of, as the excitement attending their application overbalances any good they may accomplish.

If we fail to secure reaction by the maintenance of absolute quiet, the judicious administration of sedatives and the application of heat in the proper manner, we will certainly not add to our chances of

success restoring to the numerous other applications recommended by various authorities as useful in this condition.

I will close this article with a few words in relation to the time for operation in cases of shock. If the patient shows signs by increased strength of pulse and otherwise that reaction is being established, the sooner the operation is performed the better, for the administration of the anæsthetic has a decidedly beneficial influence in promoting the condition of mind which we have been directing our treatment to secure. I think a surgeon, unless he has so firmly established his reputation as to be out of reach of adverse criticism, would be very foolish to begin an important operation upon a patient so thoroughly under the influence of shock as to be insensible to pain and oblivious to all surroundings, and consequently in no need of an anæsthetic.

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### *ON DISLOCATION OF THE SHOULDER.*

By W. J. CHENOWETH, M. D., Decatur, Ill.

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[Reprint from the Weekly Medical Review.]

To railroad surgeons dislocation of the shoulder is of special interest. 1. Because of its frequency. In general practice it occurs as often as all other dislocations together. In railroad practice the proportion is greater. This is because when a train in motion is suddenly stopped, the upper part of the body is apt to be hurled with great force against the side of the car or other immovable body, and a person falling from a train instinctively throws his hands forward to protect himself; and when exposed in a wreck, he is caught by the hands and dragged with considerable force. The joint has but little power of resistance to any of the causes mentioned. 2. Because an unrecognized, imaginary or maltreated dislocation may subject the company to great expense and us to censure. That the dislocation is liable to escape recognition will appear from the fact that in a total of seven cases occurring on the Wabash, St. Louis & Pacific Railway, treated by us, two had been mistaken for fractures—the first, that of a brakeman, who had fallen from a car while the car was in motion and received an injury of the right shoulder. A physician had splinted and bandaged the arm for supposed fracture of the surgical neck of the

humerus. When brought to Decatur, the next day after the accident, his shoulder was so painful that he begged me not to change the dressings. And, as I did not suspect the character of the injury, no attempt was made to remove them until they were so loose as to demand it. So soon as the shoulder was exposed a dislocation was apparent, and was easily reduced. The other was a brakeman, whose shoulder was dislocated in a wreck a few miles from Decatur. He was attended by two or more physicians in the neighborhood, who supposed that he had fracture of the acromion. Nine days after the occurrence of the accident my son, Dr. Chenoweth, was directed by the attorney of the road to visit the man and give his opinion of the injury and of its probable permanence. Discovering a dislocation instead of a fracture—he immediately reduced it, to the great relief of the man, and, as estimated by the attorney, to the saving of more than a thousand of dollars to the company.

An instance of an imaginary dislocation occurred in connection with our railway practice which may be profitably recalled. A girl about fifteen years old, in company with a brother younger than herself, attempted to cross the railroad in a two-horse wagon at a street crossing in Decatur, in front of a moving train, when the horses suddenly turned to one side and threw the wagon against a coach. The girl received an injury of the shoulder, which was thought by a physician, who saw her half an hour after the accident, to be dislocation of the humerus. Counsel having been called by the family, the attorney of the road, who was on the train at the time of the occurrence, requested me to be present at the consultation. One of the physicians pointed to the swollen joint, apparent depression below the acromion, the glenoid cavity, as indicating dislocation. The head of the bone certainly was singularly prominent and apparently internal to its normal position, but there was freedom of motion, after the arm had been gently handled, and the other shoulders presented the same unusual characteristics. All of us were convinced that there was neither dislocation nor fracture.

Dislocation of the humerus is so frequently associated with injury to the muscles, nerves, bones, blood-vessels or ligaments, that we expect shrinking of the muscles, stiffness of the joint, pain and imperfect use to result, but neglect on our part will not justify their presence.



In dislocations of the humerus we usually find : 1. A depression under the acromion. 2. The elbow carried outwards. 3. That the hand of the affected side can not be placed on the opposite shoulder at the same time that the elbow touches the body. 4. If the head of the bone can be felt it will move with the shaft. 5. The arm is lengthened in subglenoid and subcoracoid ; shortened in subclavicular and subspinous dislocations. 6. Pressure on the axillary plexus will cause numbness of the arm, and, if the elbow is forced toward the body, pain.

Professor Roeser (1857) suggested that difficulty in reduction depends on ability to ascertain the direction and position of the head of the bone in relation to the rent in the capsule, and not in muscular contraction. Muscular contraction changes the position given to the bone by the force applied, and it is, therefore, necessary to restore it to the first position before any attempt is made at reduction. Many persons in this country hold similar views, while Hamilton and others think that “muscles constitute the sole or the main obstacle to the return of the bone to its socket,” and refer to “the extensive laceration which the capsule generally suffers, and to the constrained and almost uniform position of the arm” as proof. Muscular contraction is apparent, but when a dislocation has been produced in the dead subject and the muscles attached to the joint have been severed, it has been found that the difficulty of reduction was in proportion to the size of the rent in the capsule, and to the relation of the head of the bone to the position it had at the time of the dislocation. To cause the humerus to assume the position it had at the time the accident occurred, in the living, we will be greatly assisted by only moving the arm only in that direction in which it can be done without giving pain. In every dislocation some one or more muscles are put on the stretch immediately, and others become tense in a short time, by contracting, so that we are liable to tax an already extended muscle by traction in any direction. But as the deltoid and supra-spinatus are more certainly put on the stretch than any others, we may usually elevate the arm without giving pain, the act of lifting the arm relaxing the muscles. But every muscle concerned in holding the arm in its first position will be relieved of more or less painful contraction, the pain caused by traction being a protest against further extension in that direction. The muscular contraction which fastens the bone in its unnatural position is an unerring guide to its release.

The patient should be placed on his back on the floor, the surgeon taking a position outside of the dislocated humerus, grasping the arm with his hand and placing the other on the head bone, if it can be felt; the arm should be gently lifted from the body, at the same time traction should be made in the direction of the long axis of the humerus. It often happens that the bone will slip into its socket before it has been raised to a right angle with the body; but at times it may be carried almost perpendicular, or the axis of the bone be parallel with the body, without reduction. After it has been elevated as high as possible without causing pain, an attempt should be made to bring the arm forward and downward in the direction of the opposite groin. If the head of the bone has been caught on the edge of the glenoid cavity, the scapula will usually recede and the reduction occur immediately, the mobility of the scapula favoring the process. If the bone does not slip into its socket, it should be held steadily in its position and traction be continued. If not yet successful, the arm should be carried backward, or both backwards and downwards. No force is required from first taking hold of the arm until reduction is accomplished. We should watch for every indication of pain, so that we may desist from attempts in the direction causing it; always endeavoring to make traction, to elevate, rotate or otherwise move the arm in that direction where there is least opposition from muscular contraction.

Five minutes is a long time to consume in effecting a reduction, but if an hour or longer is demanded, it should be cheerfully given, rather than by impatience or carelessness to cause pain, which is evidence of the application of force in an uncalled-for direction.

*PROCEEDINGS OF THE SECOND MEETING OF THE  
SURGEONS OF THE EASTERN DIVISION OF  
THE W., ST. L. & P. RY.*

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The Surgeons of the Wabash, St. Louis & Pacific Railway met in annual convention in the Circuit Court Room, in the city of Fort Wayne, June 4th. Dr. J. T. Woods, Chief Surgeon, presided, and Dr. C. B. Stemen acted as secretary.

The following surgeons were present at the session :

Ohio & Indiana Division—J. S. Gregg, M. D., Fort Wayne ; C. B. Stemen, M. D., Fort Wayne ; D. P. Aldrich, M. D., Defiance, Ohio ; A. H. Shaffer, M. D., Huntington, Ind.

Detroit & Indianapolis Division—C. B. Higgins, M. D., Peru, Ind. ; William Scott, M. D., Kokomo, Ind. ; G. R. Reynolds, M. D., Plymouth, Ind. ; A. D. Coe, M. D., Mexico, Ind. ; T. B. Campbell, M. D., West Lebanon, Ind. ; G. D. Linvill, M. D., Columbia City, Ind. ; F. W. Fanning, Butler, Ind.

Illinois Division—C. V. Rockwell, M. D., Taylorsville, Ind. ; J. D. Colt, M. D., Litchfield, Ill. ; R. M. McMahon, M. D., Quincy, Ill. ; B. M. Griffith, M. D., Springfield, Ill. ; Joseph Pogue, M. D., Edwardsville, Ill. ; W. J. Chenoweth, M. D., Decatur, Ill. ; P. H. Barton, M. D., Danville, Ill. ; L. Mathews, M. D., Springfield, Ill.

Cairo Division—F. W. Beard, M. D., Vincennes, Ind.

Peoria Division—W. T. Beadles, M. D., Bushnell, Ill. ; H. Steele, M. D., Peoria, Ill. ; Frederick Cole, M. D., El Pasco, Ill.

Chicago Division—H. B. Brown, M. D., Lincoln, Ill. ; J. C. Buchan, M. D. ; John Davis, M. D., Chicago ; Roswell Park, M. D., Chicago ; D. Duckett, M. D., Forest, Ill.

Dr. F. Cole, of El Pasco, Illinois, read a very able and interesting paper on "Railroad Accidents to Feet and Hands," which was discussed by Drs. Barton, Griffith, Gregg, Park, Beard and Chenoweth.

On motion of Dr. Griffith it was ordered, in the discussion of future papers, that each speaker be limited to five minutes. Dr. Higgins, of Peru, read a paper on "Shock in Railway Accidents." This paper showed careful thought in its preparation.

Drs. Williamson, of Ottumwa, Iowa ; Van Buskirk, Porter and Hetrick, of this city, were introduced to the meeting. Dr. J. T.

Woods, Chief Surgeon, then made some interesting remarks on the last paper.

Dr. McMahon, of Springfield, Ill., read a lengthy paper on "Some Distinctive Features of Railway Injuries, and Their Treatment."

Dr. C. V. Rockwell, of Taylorsville, Ill., read a paper on "The Relief of Shock and the Induction of Rapid Anæsthesia in Railway Injuries."

Drs. Chenoweth, Scott and Griffith reported cases of shock. The papers and the reports of cases were discussed.

Adjourned until 1:30 p. m.

Met at 1:30 p. m., and the Association transacted some executive business.

On motion, an assessment of \$1.00 was made on each surgeon to aid in paying the expenses for printing, &c.

The election of officers resulted as follows: Dr. J. T. Woods, Chief Surgeon, President; Dr. C. B. Higgins, of Peru, Vice-President, and Dr. C. B. Stemen, Secretary and Treasurer.

On motion, the officers of the Association were made a committee on publication, and also to select the time and place of the next meeting.

Dr. Gregg read a paper on "The Special Qualifications of Railway Surgeons," and Dr. Matthews on "Sponge Grafting"

Dr. Scott read a paper on "Compound Fractures of the Lower Extremities," which Drs. Stemen, Shaffer, Reynolds, Beard and Cole discussed. Dr. Campbell read a paper on "Hot Water Applications in Railway Injuries."

Dr. Linvill, of Columbia City, made a report of an interesting case, and Dr. Roswell Park, of Chicago, gave a very interesting lecture on "Extremopore Antiseptic Dressings in Railway Injuries." Dr. Park is editor of the *Weekly Review*, of Chicago, and is an able and interesting speaker.

The meeting adjourned until 7:30 o'clock.

At the evening session several interesting papers were read and discussed, and Dr. Park again favored the Association with the report of a very interesting case of fatty embolism. The Association tendered a vote of thanks to Drs. Stemen and Gregg for the manner in which they had provided for the meeting and for their hospitality.

At 9 o'clock the meeting adjourned and proceeded in a body to the residence of Dr. C. B. Stemen, on West Wayne street, where they were given a reception by Drs. Gregg and Stemen.

J. T. Woods, M. D., *President*.

C. B. STEMEN, M. D., *Secretary*.



## COLOR BLINDNESS.

By C. B. STEMEN, M. D., Fort Wayne, Ind.

The earliest account of this ocular peculiarity is given by John Dalton, a celebrated English chemist and scientist. He was himself color-blind, and hence this defect of vision is sometimes called *Daltonism*. October 31, 1794, before the "Manchester Literary Philosophical Society," he read a paper entitled, "Extraordinary Facts Relating to the Vision of Colors." In that paper he refers to his own case, and relates that, when a boy, he was present at a review of troops. Upon hearing his comrades remark of the beauty and splendor of the military costumes, he asked in what respect the *color* of the soldiers' coat differed from that of the grass on which they trod? It was the deluge of derisive laughter and the contemptuous remarks of his fellows in response to his inquiries that first made him aware of his defective eye-sight.

Besides the blue and the purple of the spectrum, he was unable to realize but one color—yellow.

Quoting his own words, he says: "That part of the image which others call red appears to me to be a little more than a *shade* or defect of light. After that, the orange, yellow and green seem one color, which descends pretty uniformly from an intense to a rare yellow, making what I would call different shades of yellow."

No mention has been made in any ancient work earlier than the time named—1794—and yet no doubt this ocular defect existed in all ages, and among all classes, just as it does at the present time.

The subject is one of great interest to the railroad surgeon, as the probabilities are that many of the States will legislate requiring that all engineers and firemen will have to be examined by competent surgeons as to their perceptions of color—compelling railroad companies to employ only such who hold a certificate of perfect vision. I shall not enter into a lengthy discussion of the many theories of this subject, but will give a few statistics and the best method of making the test.

The theory of color perception now generally accepted, was first presented by Thomas Young, an English physician, about the year 1802, and most ably defended by Dr. Holtz, a German physician and surgeon, in 1867. Their theory is based on the assumption that three distinct kinds of nerve fibers exist in the retina of the eye, the

excitation of which gives, respectively, *red*, *green* and *violet*,—fundamental sensations of color. Homogenous light excites all three, but with different intensities. Just in proportion as these sets of nerve fibers are capable of excitation, just in that proportion will the color-perception be accurate and reliable.

If the fibers naturally susceptible to excitation of red be wholly paralyzed, or undeveloped, then the complimentary color will take the field, and complimentary shades as well. Thus white becomes bluish green, and so on through the entire catalogue of complimentary colors incident to red. Thus it was that Dalton could not distinguish between the red coats of the British soldiers and the color of the grass. The rods and cones in the *retina* receiving the waves of light and carrying them to the fiber of the optic nerve, designed to receive the impressions of red, were impaired, and so its complete impression was the same as the grass, which he could appreciate, as the nerve fibers for green were normal.

By far the more common defect in color-perception is insensibility to red and its compounds. But I have said more than I intended on this point. We should, however, have stated that in some cases we find total color-blindness, while in others we find only a diminished perception of color.

The question, which interests us more than the theory, is this: What proportion of the community is found to be subjects of this defect? More males are affected than females; in fact the latter are singularly free from the affection, or defection. The majority of observers find but little, or only slight, variations in males as to the per cent. of the affected arising from race, social status, employment, business, &c. Most find over three per cent., and few reach five per cent. Dr. David D. Beck, in an able paper on this subject read before the meeting of the Alumni of the Medical College of Ohio, made the statement, "That a general average of tens of thousands of examinations that have been recorded will show about 4 per cent.; in other words, about one man in twenty-five is color-blind to a greater or less degree. As regards females, the examinations show about one-fourth of 1 per cent.; that is, one in every four hundred or five hundred—at any rate a very small proportion."

Now, how does this proportion—and that is the essential point—hold good among railroad men and pilots? We find the per cent. to

be practically the same. Holmgren found among nearly 8,000 railroad men 2 1-6 per cent. color-blind. Fontenay, of Copenhagen, found among 2,700 railroad employes, 3 per cent. Dondus found among 2,300 railroad men in Holland, 6½ per cent. Krohn, of Finland, found among 1,200, 5 per cent. Two thousand employes of the Pennsylvania Central, 4 1-5 per cent.

Now, since the flags and lanterns used by all the railroads are white, red, green, &c., and as this is the most common form of color-blindness, we need nothing further to portray the danger to life and property. In my judgment, however, it *very rarely* occurs that a man is so deficient in this regard as to entirely incapacitate him for railway service, inasmuch as the slightest variation in shade would give him a foundation on which to establish a judgment as to the signal employed. To illustrate: A. is a color-blind engineer. He may not be able to say this flag is red and this one is green; but he *does* recognize a difference in shade, as we would note a difference in *yellow* and *orange*; and by education he is able to judge as between them. They may both appear green to his eye; but there are two shades, and he knows that the one shade signifies danger and the other safety. This fact has been established in the case of a color-blind engineer on one of the leading railroads in this country. For thirty-six years he had been in active service. He could not tell anything about red and green, as such, yet he had made a most excellent record of service. He saw the two shades of green (that is, all colors were green to him, like grass,) and these two shades served his purpose just as well as the full realization of red and green would have done. No doubt this man became acquainted with these shades while employed as fireman, and by the time he was sufficiently skilled in the management of the machinery of the engine to be able to manage it on the road, he had also educated his eye sufficiently to detect the different shades of the signals.

We would not be understood to advocate the employment of men as either firemen, conductors or engineers on our railroads who have not perfect color-perception, and give it as our opinion, that all railroad companies should have a careful examination made as to color-perception of all who come seeking employment; and it would be well to have some one appointed who should examine all applicants for positions, and that his certificate should be required before any one

could be employed. “While the color-blind acquire remarkable skill in detecting variations in *shade* or in intensity of light, as light from a red lantern is less intense than that from a green one, and this again is less intense than that from a white one,” hence the exquisite discriminating sense in this regard covers their defect. Again, a good, vigilant fireman may assist, and in fact may *control*, the engineer in this regard ; but occasions may arise with variations in the power of the light, or color of the glass, dust, steam or fog, when this skill on the part of the color-blind would prove inadequate and disastrous results follow. We would suggest less stringent rules for those already in the service than for those who desire to enter it. There is no relief for it either by education or medicine, as in most of cases it is congenital and incurable. The best safeguard is to remove all who are at important posts and to not admit any who have any defect in color-perception.

The best method of testing is that by Professor Holmgren (which we have here), the matching of colored wools with a test skein, which is so simple, so perfect and applicable to the desired purpose, as to render its use imperative and its success a matter of necessity. Quoting his own language, he says : “Our method demands neither costly apparatus nor a special place for examination. The only necessary elements are a number of variously-colored objects. It consists in taking from a number of objects promiscuously thrown together and asking the person examined to select from amongst them all the other corresponding with the first color. With regard to the colored objects it, of course, matters little in principle what their nature is, as in the main the method never changes, no matter what the kind selected. But, practically, the choice is by no means a matter of indifference. Among the ordinary objects suggested, and also used for the purpose, are pieces of colored glass, or silk, or Berlin *worsted*, &c., the last of which seems to us the best, for the following reasons : One of the chief advantages of Berlin *worsted* is, that it can be procured in all possible colors corresponding to those of the spectrum, and each in all its shades from the darkest to the lightest. Such selections may be found in trade, and are easily procured when and where desired. It can be used at once, and without any preparation for the examination, just as delivered from the factory. Berlin *worsted* is equally colored, not only on one or two sides, but on all,



and is easily detected in a large pile, even though there be but one thread of it. Berlin worsted is not too strongly glaring, and is, moreover, soft and manageable and can be handled, packed and transported as desired without damage, and is conveniently ready for use whenever needed." Other material may be employed, such as colored paper or silk, or colored glass, wafers, colored solutions, spools of colored thread, pieces of painted wood, &c. They can all be employed ; but none of these objects are as well suited to our purpose as the Berlin worsted.

A selection is then made including red, orange, yellow, yellow-green, pure green, blue-green, blue, violet, purple, pink, brown, gray—several shades of each color, and at least five gradations of each tint, from the deepest to the lightest. The examiner selects from the collection of Berlin worsted in a pile on a convenient table and lays aside a skein of the special color desired for this examination ; then he requires the one examined to select the other skeins most closely resembling the color of the sample and to place them by its side. The color-perception of the individual is decided by the manner in which he performs his task.

The result of the comparison which the examined makes, in other words, the little skein of worsted which he selects and places by the test, shows us in reality what colors seem alike to him, and thus tells us his relative color-perception. We could prolong, in detail, the test as to the arranging of the skeins, &c., but we only desire to present to the surgeons the best recognized method for testing for this chromatic defect.

Now, with this knowledge of the facts, this appreciation of danger and the certain method of detecting it, what course should we, as the surgeons representing a great corporation, pursue in this matter ?

## REPORT OF 100 RAILROAD ACCIDENTS.

By W. J. CHENOWETH, M. D., of Decatur, Ill.

1881.—February 2: H. M. Shimer, brakeman—Left ankle sprained; trying to pass some one on a running-board, on top of a car covered with ice; fell to the ground.

February 7: J. J. Wilson, Brakeman—Palmar surface of third phalanx of middle finger torn off, exposing the bone; uncoupling engine from car.

February 14: Edward Wood, Car Repairer of Wrecking Gang—Bruise over right hip, four inches in diameter. Struck by a piece of wood five feet long, 12x18 inches, and thrown off wrecking train.

February 14: John Mackin, Switchman—Palmar surface, third phalanx, middle finger, torn off. Finger caught between a pin and the ground while trying to block a car that did not have a brake.

February 28: John Yager, Fireman—Tumefaction over region of left kidney. Fell into a pit five or six feet deep, through a hole in a turn-table, which he was crossing after dark.

March 13: Matthew E. Clark, Switchman—Fracture of right clavicle and bruise of chest and shoulder. Throttle-rest was broken and engineer could not control the engine; so that when he went in to couple, the engine, which before was going very slow, came back suddenly and he was caught between cars.

April 10: S. W. Maim, Brakeman—Dislocation of right humerus. Starting back to see if the train had broken in two, he stepped on a piece of coal, and the engine giving a lurch, he was thrown to the ground.

May 14: M. A. Gossett, Brakeman—Skin torn off left heel from behind and below external malleolus to plantar surface of foot at anterior part of calcaneum. Coupling cars.

May 10: William Hay, Brakeman—Ring-finger bruised and second and third phalanges of middle finger crushed. Was making a coupling, when the engine came back instead of going forward, as signaled.

May 24: B. L. Harvey, Switchman Amputation—Right arm crushed. Going in to couple, he could not remove the pin. On stepping from between the cars his foot caught between a plank and the

rail, and before he could remove it he was struck by a car and thrown under the wheels.

May 27: Walter Donaldson, Engineer—Left ankle sprained jumping off his engine, which was about to turn over, because of running through an open switch.

June 27: James Wigington, Switchman—Index and middle finger of right hand bruised. Hand caught, while coupling, by sliver of wood on under part of draw-bar.

June 29: John Troy, Foreman in Yard—Cut over right eye about two inches long and slight breaking down of orbital arch. He was directing the removal of cinders from the yard and, to avoid a train coming from the east, stepped in front of one coming from the west, which he did not see.

July 7: George Rigney, Bridge Carpenter—Nail of great toe torn off and second toe bruised. A train came in sight while he was working on a bridge, and two men, who were carrying a tie close to him, were hurrying to get off the bridge and dropped the tie on his foot.

July 12: S. D. Cornean, Baggage-man—Fracture of the right arm just above the wrist (colles fracture), and bruise over inner condyle of right femur. On going to door of car to deliver a bundle, he stepped on grease which had leaked from dope can, and slipped, falling from car to the ground.

July 13: John Rearden, Foreman of Yard Engine (Engineer)—Left hand lacerated. While coupling, the draw-head of car slipped under engine and caught his hand.

July 16: J. W. Hendrick, Switchman—Palmar surface of third phalanx of ring-finger lacerated and nail torn off. Had hold of a chain, to steady himself, while working under a car, and seeing an engine back down against the car he tried to get out, but forgetting that he had hold of the chain, was caught by it.

July 27: George Sage, Conductor—Right ankle swollen and blood extravasated below internal malleolus. He was standing on second car from engine when the train broke in two, and, the engine shooting ahead, threw him to the ground.

July 28: J. M. Dix, Brakeman—Right hand contused and abraded, nose and upper lip bruised and swollen. Train broke in two at night;

he ran back over ten or twelve cars, and, his light giving out, stepped off the last car attached to engine.

July 29: Willie Buck, Citizen (a lad about thirteen years of age)---Bruised on head, body hands and legs: unconscious for a time, but after vomiting, answered questions readily. Was struck by a passenger engine while crossing the track of the road (about daylight), in a two-horse wagon.

August 18: George Evans, Switchman---Nail and palmar surface of first phalanx of index finger of right hand torn off. A crooked link with which he was coupling cars, was "pinched together" by pressure of the cars, on coming together, and caught his finger.

September 3: W. B. Henderson, Switchman---Right ankle sprained. Slipped by stepping on a broken pin while switching.

September 8: Michael Kerwin, Switchman---Second phalanx of thumb of right hand fractured; thumb bruised. Slack came back and jarred the pin by which thumb was caught.

September 17. Henry Gillespie, Night Watchman---Contusion over lower half of dorsal vertebrae. Was standing on track to examine cars, to know if they were sealed, when a passenger train, which he did not see, backed down against him.

September 18: F. W. Roach, Brakeman---Integument torn off greater part both of dorsal and palmar surface of right hand, metatarsal bone and all phalanges of the middle finger crushed. His hand was caught while coupling coal car to engine---draw-bar of engine failing to enter the mouth of draw-bar of car.

October 10: George Jelkyl, Switchman---Middle and ring-finger of right hand bruised. Trying to make a coupling while making a running switch.

October 10: Michael Kelly, Laborer---Pain in left shoulder. Lever of lifting-jack struck him, the jack breaking.

October 18: Thomas Markouski, Engine-Wiper---Tibia of right leg fractured and ankle swollen. Fell through a turn-table.

November 15: Wm. Atherton, Night Yard-master, Bement---Died---Soft parts torn from right thigh-bone, exposing it almost the entire length of the bone. Attempted to cut off a car which was in motion; caught by brake-beam, thrown to ground and run over by truck wheels.

November 10: B. B. Rose, Foreman of Car Repair Shop---Nail of



middle finger of right hand torn off. While assisting in getting an engine on the track a plank under the wheel broke and caught his finger against truck.

November 11: Frank Hamrick, Switchman—Cut through the scalp on right side of head five inches long, from above the ear to neck; the right ear torn so as to expose the skull for two inches; blood running from nose and ears, and eyes crossed. Was caught between the ends of plank and the side of a box-car while coupling a flat-car loaded with plank, which projected over the end of the car, and a box-car.

November 15: Wm. Bushnell, Brakeman—Cut on side of his head. While standing on top of a car, was either struck by a piece of coal thrown at him or by a coal-shute.

November 17: Patrick Gilligan, Citizen (sixty-eight years of age)—Dislocation of left shoulder. Stepped off the north side of cars and fell to the ground, the platform being on the south side.

November 17: C. A. McDaniel, Blacksmith at Round-house—A triangular cut over frontal bone, near nose, three-fourths of an inch long. A new hand was helping him weld a continuous rod and struck his hammer and rebounding hit him.

November 26: Harry Temberton, Brakeman—Dislocation of right radius and contusion of chest. Renewing a chain coupling which had broken.

December 14: Frank Hershay, Brakeman—Died—Cut about one-half inch long, just back of parietal prominence, on left side of head; partially conscious; bloody expectoration. Attempted to step from tender of engine to box-car, and fell.

1882.—January 4: John Welty, Switchman—Thumb, index and middle finger of right hand crushed. Attempting to couple with gloves on his hands, the link stuck to his glove and he slipped and fell between the draw-bars.

January 12: Ed. Taylor, Brakeman—Metatarsal bone of great toe broken and dorsum of foot swollen. Front car of train having been uncoupled from tank of engine, while he was standing on the tank, and the engine stopping, the train struck the tank and he fell to the ground.

January 13: Charles Gillespie, Switchman—Index finger crushed.

Slack came back before he expected it, and his finger was caught between the bumpers.

January 21 : G. D. Livingston, Fireman—Wrist swollen and tender. While shoveling coal to put under boiler, a lump fell from the pile and struck his wrist.

January 28 : James Duanne, Foreman in Yard—Cut three-fourths of an inch long, in the edge of the hair, over the frontal bone. He was struck by a piece of coal while passing out of the switch-house.

January 30 : Howard Stone, Brakeman—Wrench of left side in lumbar region. He was in a caboose, which was standing on a side track, cleaning lamps, when the caboose was struck by a car and threw him against a bench.

February 12 : Ward, Citizen—Great toe crushed. Attempted to catch side ladder while train was in motion, and falling, his foot got under the wheel.

February 14 : George Myers, Brakeman—Third phalanx, middle finger of right hand, crushed. Hand caught between bumpers and draw-bar while switching.

February 20 : Fred. Kafeldt, Laborer—Cut over metacarpal bones. While loading timber on cars, his hand was caught between the timber and the car.

March 1 : Joseph Stokes, Switchman—Index, middle and ring-finger crushed. Right hand caught between dead-wood while coupling.

April 11 : Joseph Schilling, Foreman at Round-house—Left side, below nipple, swollen. Stumbled over a tie and fell.

April 13 : Jacob Walters, Brakeman—Fracture of fifth, sixth and seventh ribs, left side. While on side ladder, was caught by a car moving on a side track, and rolled between car and caboose.

May 20 : Loyd Bowerman, Brakeman—Scrotum lacerated so that both testicles extruded; tumefaction along right inguinal canal; rupture of adductor longus muscle of left side; two perforations about three inches apart on inner aspect of left thigh, near inner condyle of femur. While climbing on side ladder of moving car, was caught by a loose wire hanging from a telegraph pole, and thrown to the ground.

June 16 : John Miles, Pile-driver—Dislocation of right shoulder. He was thrown off the top of a car by a guy-pole.

June 28 : J. E. Merritt, Engineer—Both arms scalded, finger of left hand bruised, and face blistered. Train, which had parted, was scarcely coupled, when the boiler burst.

June 28 : Henry Erisman, Fireman—Both legs scalded and head bruised. On engine with Merritt.

July 28 : Charles Gillespie, Switchman—Second and third phalanges of index finger of left hand bruised and nail pinched off. Finger caught between draw-bars, while coupling.

July 24 : Ed. Taylor, Brakeman—Eyes injected and he apparently in a semi-conscious condition. He was struck over the stomach by a pole with which he was staking a car.

July 27 : J. L. Gogarty, Foreman of Switch Engine—Nail of right thumb pinched off. Thumb caught between draw-bar and dead wood while making a coupling, the draw-bar pushing in.

August 11 : Jack W. Lilley, Brakeman—Left patella bruised and quadriceps muscle disabled. While standing on the rear of a passenger train, fixing the bell-rope, a pin fastened to a chain which was attached to the platform, struck the ground and rebounded, hitting him on the left knee.

August 25 : W. R. Eldridge, Switchman—Thumb, index and middle finger of right hand bruised. Hand caught between pin and dead-wood while coupling.

August 25 : John Crowley, Brakeman—Right hip dislocated. A caboose, in which he was standing, was struck by moving cars, and he was thrown against a box and then against a door.

September 1 : J. R. Sweets, Engineer—Fracture of the acromion and shoulder bruised. Ran into a train lying at a station he supposed it had passed. (Night very dark and raining hard. No lights to be seen on forward train until close to it.) Jumped off engine before it struck the caboose.

September 1 : R. H. Perrine, Learning to Fire—Died—Scalded ; almost entire body denuded. Same collision as above.

September 1 : J. F. Cottrell, Fireman—Died—Almost entire body scalded. Same collision.

September 1 : Ed. Taylor, Brakeman—Pain with inability to move spine. Same collision as noted above. Fell from top of car. This man was injured January 12, July 24, and September 1, 1883.

September 5 : Charles D. Ackerman, Brakeman—Bruise over

gluteii muscles of left side ; excoriation on right side of chest and on right elbow. Struck against a coal chute and knocked off a side ladder.

September 16 : Wm. Schevers, Engineer—Dorsum of right foot swollen, nose bruised and suffering from pain in his head. Jumped from his engine as it was about to run off a misplaced switch.

September 16 : Charles H. Lee, Fireman—Left shoulder bruised and excoriations over malar bone and nose. Fell from engine in same accident as above noticed.

September 17 : W. N. Miller, Brakeman—Cut over mastoid process. Struck by a piece of coal thrown at him when he was on top of a car.

September 22 : Lewis Williams, Brakeman—Left leg broke above ankle. While walking by the side of a car, which was in motion—when drunk—was struck by the step or other part of car.

October 2 : Charles Litibski, Track Hand—Died—Left side of chest crushed and right humerus fractured near the middle. While at work on track, was struck by a passing train.

October 6 : Leroy Relph, Switchman—Right hand crushed. Looking back to see if there was an extra car on the train, was struck by a telegraph pole and thrown off the top of a car.

October 13 : F. H. Paine, Foreman Railway Shops—Right shoulder and chest bruised. Went between condemned cars to couple, and was caught between dead-woods.

October 26 : Eugene Ryan, Laborer—Third phalanx of ring-finger of left hand crushed. Was helping to lift equalizer from engine when it slipped and caught his finger.

October 21 : W. B. Smith, Brakeman—Cut four inches long on palmar surface of hand. Hand caught by nail on a box which he was dumping from a car.

November 2 : Edward Bowler, Switchman—Excoriation on internal aspect of left arm four inches long. Caught while attempting to couple cars, one of which had a stationary link.

December 13 : D. E. Collins, Brakeman—Third phalanx of middle finger of right hand crushed. Foot slipped while he was coupling, and, in attempting to catch himself, fell between bumpers.

December 15 : I. O. Burch, Brakeman—Thumb crushed. While coupling an engine to a baggage car, caught between dead-wood and pin.



December 20: Thomas Creeley, Switchman—Left scapula, left side of chest, back of head and neck bruised. When the cars came together, while he was coupling, the draw-bar of one car shoved in.

1883. —January 2: J. A. Swiggert, Engineer—Pain along the spinal column. Jumped off his engine when about to run into a freight train.

January 4: D. B. Smith, Fireman—Dislocated right ankle. Slipped off the step when attempting to get off engine.

January 12: S. T. Shively, Brakeman—Right wrist contused. Caught between draw-bar and dead-wood while coupling.

January 16: George Nutt, Working in Repair Shop—Cut on upper lid and abrasion of lower lid of right eye, and pain in eye. Struck by a bolt which he broke off a flat car.

February 14: Clinton Haaig, Engineer—Right hand bruised and abraded. Jumped off his engine when about to run into a train.

February 18: W. F. Harkman, Brakeman—Knee swollen. Fell over a loose brake-shoe when walking on side-track.

February 20: R. L. Clendenin, Assistant Yard-master—Meta-carpal bone of little finger crushed and left hand bruised. Hand caught between bumpers while coupling.

March 3: Geo. Jones, Switchman—Right hand swollen. Caught hand between engine and caboose while coupling.

March 7: Ed. Jolly, Brakeman—Compound fracture of middle finger of left hand. Hand caught between bumpers while coupling.

March 14: Ed. Evans, Brakeman—Died—Right thigh, leg and pelvic bones crushed. Jerked off engine while uncoupling, by engine starting ahead.

March 19: William Sandusky, Laborer—Compound fracture of radius of left arm. Struck on the arm by a bar of iron he was unloading,

March 21: C. G. Fuller, Brakeman—Second phalanx of thumb crushed and hand bruised. He was coupling engine to train.

March 23: Charles Emmett, Brakeman—Left arm crushed at and below elbow. He was coupling foreign cars and caught between bumpers.

March 28: J. F. Dayton, Brakeman—Palmar surface of the

middle finger of left hand torn off. While staking cars, his finger was caught between stake and car.

April 7: Thomas Kennedy, Fireman—Wrist burned. While oiling engine, was thrown by a lurch against steam pipe.

April 17: S. D. Cornean, Switchman—Thumb, index and middle finger of right hand crushed. He was coupling caboose to refrigerator car.

April 25: J. E. Crowe, Switchman—Dorsal surface of index and middle finger bruised. He was coupling engine to car.

May 1: Charles Cornean, Yardmaster—Right leg bruised and muscles of foot sprained. While on platform at depot was struck and thrown down by the upsetting of a loaded truck, and an iron safe and a number of boxes fell on him.

May 3: Charles Hershey, Switchman—Cut on outer aspect of thigh. Struck by a torpedo which exploded under a caboose near him.

May 21: John Murphy, Fireman—Colles fracture. Fell from tank to the ground.

June 4: George Werts, Oiler—Bruise over clavicle, right arm and ear, and over left side of face and temple. While attempting to get on one caboose was struck by another going in an opposite direction.

June 4: W. H. Lilly, Section-hand—Bruise of middle and ring-finger of right hand. While throwing ties off a car, his hand was caught between tie and car.

June 8: A. B. Spitler, Trackman—Right ankle sprained. While lifting at a bar of railroad iron with a "pinch-bar," he fell and some one fell on him.

June 22: E. C. Wood, Helper—Middle finger of right hand bruised. While running a wheel from under a truck, his finger was caught between a jack and the wheel.

The most insignificant, as well as the most serious, injuries have been tabulated, but the number is too small for accurate, or even approximately accurate, conclusion. But statistics may be gathered which will point, almost unerringly, to the number injured in the performance of every duty involved in the service, and thus lead to the avoidance of accidents, or to means of relief, to those unavoidably

injured. In the one hundred cases above reported there were of—

Brakemen .....	32
Switchmen .....	22
Firemen .....	10
Engineers .....	6
Laborers .....	8
Citizens. ....	3
Various others.....	19
	<hr/>
	100

The injuries were distributed over the body as follows :

To the head .....	9
“ back .....	5
“ hands .....	35
“ shoulders .....	7
“ arms .....	7
“ thigh.....	6
“ leg.....	4
“ wrist .....	3
“ ankle.....	6
“ foot .....	4
“ chest .....	2
“ knee .....	2
“ scrotum .....	1
“ various parts at the same time.....	9
	<hr/>
	100

In some instances, in the above enumeration, the part where the greatest injury appeared to be is named, while other parts suffered, but less.

The injuries received while coupling.....	36
Fall from cars or engines.....	18
Struck by engines.....	5
Struck by coal .....	5
Hurt while loading cars.....	3
Hurt by falling into pits.....	2
Hurt while in a caboose by being thrown against benches or other objects, the caboose being struck by cars while switching .....	2
Caught by passing while on step-ladders.....	2
By explosion of boiler.....	2
Scalded in a collision.....	2
Injured by as many various accidents as there were men hurt .....	23

There were six deaths resulting from the accidents :

Of switchmen.....	1
Of brakemen.....	1
Of firemen.....	2
Of oilers.....	1
Of laborers.....	1

The switchman was caught by a brake-beam and thrown to the ground and run over by the cars

The brakeman was jerked off the engine while uncoupling, by the sudden rush ahead of the engine.

The firemen were scalded in a collision. (There was another person killed at the same time, who was reported by Dr. Vance, of Bement, and is not in the above list.)

The oiler was struck by a passing train while attempting to get on a caboose.

The laborer was struck by a train while he was working on the track.

There are several other analyses of the above cases that would have justified the loss of time necessary to have made them, but I could not get the time because of other engagements.

## *HISTORY, MANAGEMENT AND TREATMENT OF RAILROAD INJURIES.*

By W. T. BEADLES, of Bushnell, Ill.

After a more careful consideration of all the Railroad Injuries I treated during the past year, I concluded it would consume too much valuable time to give a complete history of each case, and without it not one would be of great interest ; I shall therefore confine the subject to two cases of lacerated wounds of the right foot and leg. The similarity of the injuries and marked contrast as to results make them of chief importance ; and while I claim no extraordinary skill in their management or treatment, yet claim to have done the best that could have been done under the circumstances. Nor do I present them to you for your careful deliberation on account of any good or bad results, or newly discovered theories of treatment, but mainly on account of the obstacles that arose preventing a judicious management of one of them for the Railroad Company, man, or myself.

Formidable operations in surgery, followed by a quick recovery,



builds up a fame. That is desired by every surgeon. And while he labors zealously to obtain these ends, he is laboring equally as hard for the welfare of those who are so unfortunate as to be wounded, and likewise for all others interested. But how is it with the people outside of the profession? Do they look at this matter as we do, and lend their aid in behalf of suffering humanity? No, I regret to say, as a usual thing, they do not, and instead, often, through their influence, obstruct the pathway of the physician or surgeon in his achievements, as will be illustrated in one of these injuries, by the wounded man, through such influences, being placed under surroundings that assisted much in protracting his recovery, as well as endangering his life; therefore these are matters for careful thought when so much of importance is at issue.

An operation may be performed with great skill and attended likewise from day to day; but if the surroundings are potent with influences deleterious to health, what can the surgeon expect? Can he look forward with any degree of pleasure as to the results of his operations? No, he can not; therefore the necessity of having the wounded placed under the most healthful influences, as an abundance of fresh air, sunlight, the great purifier of nature; large bed-room, easily ventilated; clean bed and bedding, and quietude, and other matters equally as important is alimentation. These are matters essential to the successful management of the wounded, especially in amputations of a grave character, and without such precautions the surgeon is defeated in his expectations and his reputation for skill goes with it, if he has any.

While such accommodations are not easily obtained on the spur of the moment—just at a time when they are needed—still they can be provided for beforehand, as are now arranged by the Wabash, St. Louis & Pacific Railroad Company. This may require moving the wounded some distance; yet the sufferings they would have to endure and dangers undergo are much less dangerous to life than the unhealthy surroundings and poor accommodations of many houses along the railroads, if they are moved with care. If the consequent shock incident to railroad injuries is so great that a patient would not survive an operation or endanger his life in being moved, then he should be provided for temporarily, and with the judicious use of stimulants to assist reaction coming on and anodynes to allay pain; then, as soon

as reaction will permit an operation with safety, as an amputation below or above the knee, he can be moved with as much or more safety to life than undergo the amputation, thereby placing the wounded under the most favorable conditions for a speedy recovery. Delays are not dangerous in such cases, as without reaction the patient will not survive the injury. Preparatory to the wounded being moved, they should be placed on stretchers, with the injured parts temporarily dressed and placed in as comfortable a position as possible, and stimulants given to support the action of the heart and anodynes to allay pain. Thousands of wounded have been moved by this means and done well, while many died, as was exemplified during the late war; but they did not have the care and easy mode of transportation that is at hand in railroad injuries at the present time. These opinions are based on a practical experience of four years in the army during the late war and the numerous cases of railroad injuries treated each year since the war.

With these preliminary remarks, which are as brief as could be made without doing injustice to the subject, I call your attention to the first man injured, a young man by the name of Eugene Nickey, who had his right foot and leg crushed to the middle of the leg. While he was intoxicated and endeavoring to get off of a moving passenger train at midnight, his leg was caught under the wheels of the coach, just how, I am unable to state. He was taken to his parents' residence, a short distance from where the accident occurred, where they had a large, comfortable room, easily ventilated, situated on the south side of the house, securing plenty of sunlight, a clean bed and bedding. To allay pain, gave sulphate of morphia, hypodermically, and as he was under the influence of stimulants did not give any, and by the time arrangements were complete to amputate the leg he was in a condition to undergo the operation. On close examination of the mutilated limb, thought best to amputate about three inches below the knee, and to be safe in securing sound flaps, free from contusions, to make short anterior and posterior flaps, as recommended by Holmes' System of Surgery, vol. 3, page 599. After arresting the hemorrhage after the usual means and cleansing the flaps by triturating carbolized water on them and inserting a tent at the external angle of the flaps, to secure free drainage, closed the wound by drawing the flaps together and securing them with the interrupted suture, supported with adhe-

sive strips between the sutures ; then dressed the stump with an ointment composed of paraffine, cosmoline and carbolic acid, hoping to obtain union by the first intention. The second and third days bathed the stump with carbolized water and dressed as before. The fourth day, found the external part of the anterior flap, about the size of a silver dollar, sloughing, on account of being contused, the other portions of the stump uniting without suppuration ; continued the bathing and dressing of the stump from day to day as long as he was under my care—eighteen days, not requiring my attention any longer. The fifth day, removed the sutures and applied fresh adhesive strips, to support the flaps until more firmly united, which was done occasionally from time to time as indications required. The ligatures came away the twelfth day. During the acute stage his pulse ranged from 90 to 100, and temperature 99 to 102. And to procure rest gave sulphate of morphia, hypodermically, and evacuated the bowels ; when necessary, tartrate soda and potassa. Nothing occurred remarkable in this case, more than to note that the stump swelled very little, if any, and after the precaution taken in securing sound flaps, yet it proved otherwise, though not seriously ; still, nature was six weeks in repairing the damage resulting from the sloughing, and as soon as he was able to be out on crutches he imbibed intoxicants freely again.

The second man injured had good habits and constitution and about twenty-six years of age, by the name of Patrick T. Brown, who was a fireman on the Wabash, St. Louis & Pacific Railroad. A telegram reached me from the Superintendent, about 1 o'clock a. m., November 26th, stating that a train had been wrecked at Sciota Station, twelve miles west of here. The engineer badly shocked and bruised ; fireman's leg crushed, requiring it to be amputated, and inhaled steam, and brakeman killed, and for me to go out on the first train, which would be along in a short time ; and if I wished to bring the wounded men here, to do so. Therefore, before going, arrangements were made at a hotel close to the depot for the necessary accommodations for them, provided they were in a condition to be moved.

When I arrived at the wreck, which was near 3 o'clock a. m., the engineer had recovered from the shock and able to walk around, therefore required no attention from me. The fireman was laying on a long cushion placed on a wide board in the waiting-room of the

depot, under the care of a physician, who had dressed his leg with a temporary dressing, and placed the leg in as comfortable a position as possible and gave anodynes and stimulants until they had their desired effect ; consequently he was in a good condition to be moved some distance on the cars, with care and without delay : therefore informed him what I wished to do ; that it would be far better for him to be moved where he would have the best of care and attention, as well as good, healthful surroundings ; that it would consume more time to look up good accommodations closer at hand, than it would to take him twelve miles on the cars. But the depot being full of citizens of the small village, who assisted in rescuing him from his perilous condition in the wreck—as his leg was fast and he could not get out—and instead of assisting in my efforts to take him where I was confident it would be best for him, and contrary to my urgent solicitations, they advised him most strenuously not to submit to being moved so long a distance, as it would endanger his life (as if I did not know what the man could endure or what was his best interests); that they would take just as good care of him as could be done anywhere else. It was his opinion, if he could be taken twelve miles on the cars, safely, he could go likewise seventy five miles, and that distance would take him home, where he preferred to go—which would have been much better for him, as well as all others concerned, if it could have been done without endangering his life, rather than remain where so little accommodation could be procured necessary for the comfort and well-doing of a wounded man. So, as he could not go home, he declined my advice, as if he had very little confidence in me, which he regretted exceedingly afterwards he did not take. I telegraphed the Superintendent the circumstances and requested instructions, but received no reply after waiting as long as was practicable, still urging him to accept my proposition ; yet he continued to decline, as the citizens still urged him to remain—for what motive I will leave you to conjecture.

Finally I requested to know of the citizens—as the delay was consuming much valuable time—who wished to take him ; when Mr. Long, proprietor of Long's Hotel, announced he would, and, as a last resort, he was taken to this hotel, where his leg was amputated and he was provided for the best the circumstances would permit. As soon as he was under the influence of chloroform, removed the temporary dressings of the leg and found the foot and leg crushed badly, the



bones comminuted to the middle of the leg, the laceration of the soft parts being higher anteriorly than posteriorly; therefore amputated about four inches below the knee, forming a short anterior and a long posterior flaps, including as little muscular tissue as the circumstances would permit in order to secure sound flaps, if possible, and have an abundance of covering for the bones in case of sloughing of the flaps. Arrested the hemorrhage from the large arteries with ligatures, still continuing to have an unusual amount of hemorrhage from the numerous small vessels, which gave some trouble in arresting. At the suggestion of the physician who assisted in the amputation to use hot water, as has been recommended by many of the profession during the past few years, still having some doubts as to the propriety of using it or its efficiency in arresting hemorrhage, until applied to a bleeding surface, as in this instance—as it checked the hemorrhage promptly by coagulating the blood in the ends of the vessels. Yet it is a questionable mode of arresting hemorrhage, as will be illustrated hereafter.

Then cleansed the flaps with carbolized water and inserted a tent to secure free drainage, drew the flaps together and secured them by the usual means,—the suture and adhesive strips,—dressed the stump with ointment of paraffine, cosmoline and carbolic acid, and placed the man on a straw-bed (as it was the best they had for a wounded man), in a room ten feet square and seven or eight feet high, with a window on the south side of the room and a porch projecting over it about seven feet wide, excluding the sunlight from the room. This bed-room was heated by a stove in the waiting or sitting-room, which joined the bed-room and was free for any one who wished to come in and warm and go out, and where the family sat, as well as others, through the day time and until ten or eleven o'clock at night, making much confusion and noise; and, contrary to my urgent requests, this condition of matters continued more or less as long as he was there, and likewise unable to maintain a cleanly condition of the bed-room and bedding.

Continued to treat the case under these influences to the best of my ability, by cleansing the stump with carbolized water and dressing as before once or twice a day, as indications required, until the fifth day, when, on account of the extensive sloughing of the flaps, changed to warm water dressings, impregnated with carbolic acid to hasten the

sloughing of the dead tissues, at the same time removed the sutures and applied fresh adhesive strips to support the flaps until firmly united, which were changed to fresh ones as was required from time to time. Continued the warm water dressings fifteen days, when the dead tissues had sloughed off, leaving a healthy granulating surface ; at the same time the flaps had united on the internal and external part of the stump, or leg, the sloughing being confined to the center of the flaps. The ligatures came away about the twelfth day.

The twentieth day of the injury, dressed the granulating surface with carbolized oil, after bathing the stump with carbolized water, which was kept up from day to day until the thirty-sixth day, when the stump inflamed badly from phlegmonous erysipelas, from what cause was unaccountable to me at the time, unless it was the surrounding influences, as for some time the weather had been extremely cold, rendering it difficult to keep his room comfortably warm, wherefore not much fresh air entered the room or kept it properly ventilated, but afterwards learned the stump became chilled the night before it inflamed, and was the exciting cause. Again changed the dressings to meet the indications, to enveloping the inflamed stump in cloths dipped in mucilage of slippery elm bark, and continued it balance of the time he was under my care, seven days. Under its soothing effect and tonic treatment of ten to fifteen drops of tincture chloride iron and two to three grains of sulphate quinine, given alternately every three or four hours, which had been given from time to time previously as supportive measures, and the most nutritious aliments that could be obtained—as they were scarce at this hotel—the inflammation abated, yet not without numerous abscesses forming in the stump. Did not have much swelling of the stump, nor did he complain of much, if any, pain, until it inflamed with erysipelas, therefore required very little constitutional treatment ; only gave occasionally anodynes to procure rest, and a cathartic to evacuate the bowels when necessary.

The seventh day from the time the stump inflamed he was taken home to Peoria, as a change to more healthful surroundings would be beneficial to him ; and as the inflammation had abated and weather moderated, concluded he could go home safely, with proper care, where he was placed under the care of Dr. Steele, the Company's Surgeon at that place, who completed the treatment. The extreme

cold weather and snow storms prevented taking him home before the stump swelled. This illustrates clearly the great importance of the surgeon having charge of wounded men under his care, as without it he is sometimes severely censured for the want of skill, when he is not to blame, and the lives of the wounded endangered or protracted in their recovery.

As to the propriety of using hot water in arresting hemorrhage in amputations, does not appear objectionable if it can be done in a manner to only coagulate the blood in the ends of the bleeding vessels ; but it appears obvious to me that in the usual mode of applying it and the temperature required to obtain its desired effect—that of coagulating the blood in the ends of the bleeding vessels and their contractility—it coagulates the blood much more extensively in the vessels, as well as the capillaries and albumen of the serum, as it flows, if not arrested than is desired. If the first effect of hot water is relaxation of the vessels as well as the capillaries, they soon become filled with blood, which is coagulated before the secondary effect is obtained—that of—said to be contraction. Then, again, it has been advocated that hot water stimulates muscular contraction, which, I am of the opinion, is true, and by its stimulating effect on the muscular coat of the vessels causes them to contract, thereby arresting the hemorrhage. Yet the contraction does not take place before the blood coagulates, therefore the flaps are more or less engorged with coagulated blood and the flow of serum arrested, which are its objectionable features.

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### *ATTENTIONS TO THE BLADDER IN RAILROAD INJURIES.*

By A. L. WHITCOMB, M. D., Tolono, Ill.

When I first received the circular of our Chief Surgeon, the President of this Society, I was puzzled to decide what topic to select. I at length decided to take "Attention to the Bladder after Railroad Injuries."

I shall speak first of injuries to the bladder itself, and then to interference with its functions. Wounds of the bladder are at all times uncommon ; indeed, from hospital statistics, they seem to be the rarest of accidents. Among 16,711 surgical cases treat at St. Bar-

tholomew's Hospital from 1869 to 1875, inclusive, but two cases were of injuries to the bladder. Accidents to the bladder are usually caused by crushing or bruising of the pelvis, or from falling or being thrown violently to the ground—the very conditions that are more often present in Railroad Surgery than anywhere else.

We may find rupture of the bladder, or incised, punctured or lacerated wounds. Rupture of the bladder is commonly fatal under any treatment. The symptoms are intense pain, collapse, urgent but fruitless attempts to urinate, and in a short time the ordinary signs of peritonitis. Rupture most commonly occurs in the posterior part of the bladder. When it occurs in the anterior part the prognosis is a little more favorable. The treatment for rupture is to introduce a large, flexible catheter, (which, as a rule, should be secured in place,) the urine being allowed to run off constantly by means of a rubber tube attached to the catheter. Get the patient, as soon as possible, under the full influence of opium. Free incisions should be made on the first manifestations of urinary infiltration.

Contused or lacerated wounds, when in the part covered by peritoneum, are usually fatal; but recovery may take place when in the perineal region. The treatment is about the same as for rupture.

The surgeon will more frequently be called upon to treat accidents that interfere with the functions of the bladder, such as retention and incontinence of urine. Retention of urine may be the result of partial paralysis, caused by injury to the head or spine. In his anxiety the surgeon may neglect to ascertain whether the bladder be acting properly. Some of the drugs most frequently used to relieve the patient's pain, may cause retention of urine—opium and morphine especially, and sometimes belladonna or atropia. The surgeon should be particular, at each visit, to ascertain whether the patient has urinated freely. If he has not done so, the catheter may be needed and be used. The kind of a catheter will depend upon the preference of the surgeon. I usually use the ordinary flexible catheter with a stylet, partially, and sometimes wholly withdrawing the stylet before introducing the instrument.

When I find difficulty in introducing the catheter, I inject the urethra with warm sweet oil, containing about two per cent. of carbolic acid, after which the catheter can usually be passed. I have remembered to use as large a catheter as the meatus will admit. The size



of the catheter must, of course, vary according to the presence or absence of stricture.

When giving opium, morphine, belladonna or atropia, I usually direct that the patient shall drink freely of lemonade. When he does this retention of urine is much less frequent than when he omits it.

Incontinence of urine will usually yield to small doses of strychnia either alone or combined with belladonna.

We should always remember that a constant dribbling of urine denotes retention, and not incontinence, and direct our treatment accordingly.

Conscious that there is but little, if anything, new in this paper—mostly the calling attention to little points that may be forgotten—it is respectfully submitted to you for consideration.

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## *THE MEDICAL TREATMENT OF SURGICAL CASES.*

By N. N. VANCE, M. D., Bement, Ill.

For fear the title of my paper may mislead you, I shall state in the beginning that I shall offer you no ready-made prescriptions. My sole object is to call your attention to the much-neglected subject of Therapeutics—a subject which we, as surgeons, are prone to neglect, nay, even ignore.

Our Materia Medica is too closely confined to stimulants and narcotics. On being called to an injured person we usually give whisky, or morphia, or both, as the case demands, which is all right; although I have frequently seen them carried to excess. I remember one instance in which the effect of the whisky administered was more serious than the operation (amputation below the knee).

Our after-treatment is usually about the same—more morphia and whisky. Now this is not as it should be. We should make a careful diagnosis, medically, of each case, before leaving, and prescribe accordingly. If we do so, I am of the opinion it will be to our patients' immediate comfort and materially hasten their recovery.

I wish particularly to urge the individuality of cases, as regards medical treatment.

We are all well aware that injuries which are insignificant, comparatively, in one individual, are very grave in another. It is even so as regards treatment, medically. Each case must be considered alone,

and prescribed for according to the indications present. It may be necessary to alter our prescriptions frequently the first few days of our treatment, but if we will but use our best judgment, medically as well as surgically, I am persuaded we will leave our cases more comfortable and in better condition.

Now, gentlemen, my feeble effort casts but little light on this important subject. The point I wish to make (if point there be) is, the necessity of individualizing our cases and trying to discover the demands of each.

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### *ERYSIPELAS.*

By A. U. WILLIAMS, M. D., of Sullivan, Ill.

Every surgical operation, every injury to the human body, is attended with danger to the patient and anxiety to the surgeon. If the surgeon dresses the wound or operates upon the injured member, he has to fear the dangers of an erysipelatous inflammation. If he operates on account of injury to save life, or for the removal of deformity, few, if any, of the sequelæ are apt to cause such consternation in his mind as the characteristic blush of erysipelas. Commencing at the wound made by the surgeon himself, or by the accident, it may rapidly spread, hourly threatening the life of his patient, and if not checked by skillful measures, he may soon have an opportunity of exercising his judgment as to the authority of the State Board to compel him to make out a death certificate without remuneration.

It is not our purpose to classify, define and treat of the various kinds of erysipelas, but more particularly to speak of erysipelas occurring in connection with wounds.

Railroad wounds, on account of their contused and lacerated condition, are more apt to cause erysipelas than any other, especially those of the scalp and lower extremities. It is in railroad wounds that the surgeon finds the greatest danger, with the least amount of superficial injury. This is probably due to the great amount of force exercised by the cause producing the injury.

Erysipelas is very liable to occur after scarifying or puncturing dropsical parts. Mr. Holmes says that erysipelas, when excited by a wound, does not always attack the wounded part. He relates the case of a man whose foot he amputated under the most favorable cir-

cumstances, who was placed in a ward entirely to himself ; no patient in the hospital was suffering from erysipelas ; he had no erysipelatous patient under his treatment at the time ; the circumstances precluded all possibility of contagion. The wound did well, but erysipelas of the head, face and chest appeared a few days after the operation, and proved rapidly fatal. Mr. Holmes thinks the wound in this case the exciting cause, and says he has seen many other cases in which the wound was the exciting cause, but the disease appeared in a remote part. He considers it a very natural explanation, though only conjectural, that some morbid product is generated in the wound, taken up by the absorbents, carried to the heart, and thence to the part affected. This may be a true explanation or it may be that there is a predisposing cause already existing in the patient which the wound may excite to activity by lowering the vitality of the system, as it is a well established fact that all morbid matter is much more active in a debilitated condition than when the various organs of the body are at a normal physiological standpoint. Probably no wounds are so apt to be attacked as those of the scalp. The cellular form of erysipelas is the most common and often becomes a serious complication. The inflammation originates in the lesion of the cellular tissue, between the tendon and the pericranium, and is almost always of the phlegmonous form ; extends often with great rapidity over the whole head, causing intense oedema and leading ultimately to sloughing, both of the scalp and pericranium. It begins with puffiness and slight redness around the wound ; but as the inflammation is almost entirely confined to the cellular tissue, it differs from that in other parts, in that the redness is not so vivid and distinct, with a well defined margin, as found when occurring in other localities.

When erysipelas attacks a wound the parts become oedematous, accompanied with pain, increased heat, redness general, fever, tongue often white with glazed edges, urine dark, high-colored and scanty. If of the scalp matter forms in a day or two, the scalp becomes boggy, the pus burrows under the tendon, raises the scalp until distinct fluctuation is felt. The pericranium is often destroyed, and the bone becomes exposed. Metastatic abscesses often form in various localities ; a general condition of pyæmia may supervene, and the patient die of exhaustion.

The predisposing causes are bad air, habitual intemperance, poor

diet, viceral disease, especially of the kidneys. Many persons appear, without any such definite predisposing causes, to have a constitutional predisposition to erysipelas, which will show itself on the slightest cause.

Erysipelas seems to be due to a specific poison, the exact nature of which is yet undetermined. Dr. Tukomsky attempted to prove that it was bacteria, but the question is still subjudice.

The diagnosis occurring as a complication of wounds is usually obvious.

The prognosis depends on a number of different considerations. "*Ceteris Paribus*," the disease is dangerous in proportion as it is deep-seated. It depends somewhat on the extent of the affected tissue and the condition of the patient. If the inflammation spreads internally to the mouth and fauces, the danger is imminent. It is worse in epidemics. There are many other prognostic signs which it behooves the surgeon to consider before giving an opinion. It should, however, be remembered, that the disease is often salutary, preceding the definite healing of wounds and ulcers that have long been open and sluggish, baffling the surgeon's best efforts to effect a cure.

Many are the remedies used to effect a cure, and there is abundant room for the exercise of the surgeon's skill and good nursing. Husband the patient's strength; keep the secretions active as possible. Muriate tinct. iron and quinine is the sheet-anchor. If pus collects, provide free exit; open early and free. Keep the wound in as good condition as possible. For this purpose we would recommend that, after it is thoroughly cleansed, that it be dressed with finely powdered boracic acid. This is antiseptic, clean, and a wonderful promoter of granulation.

Dr. Roswell Park, of Chicago, once an honored member of Chief Woods' corps of assistants, first called my attention to its general usefulness, and I will say that I have found no one remedy that has given me such universal satisfaction in the treatment of any and all wounds.



## *SUB-NITRATE OF BISMUTH AS AN ANTISEPTIC.*

By Z. E. PATRICK, M. D., Sheldon, Ill.

The metal, Bismuth, does not seem to have been known until comparatively recent times. It is first mentioned by Agricola, who lived in the first half of the sixteenth century. Who first used it, or when it was first used, in medicine, I can not say.

I have an old Edinburg dispensatory, published in 1791, which says: "A calx and flowers have been recommended as similar in virtue to certain antimonial preparations, but at present it is of no other use than as a figment or cosmetic, and it is now entirely rejected by the British Pharmacoporia."

The medical world of to-day is not, by any means, of the same opinion, however. We are all acquainted with its value as a medicine, and probably had all supposed, until recently, that we had reached about the limit of its use in our art. But the discovery that it is a most valuable antiseptic is like uncovering a vein of gold in a mine of silver, and opens up to us new wealth of resource where nothing new was expected.

The first suggestion I received of using the sub-nitrate as an antiseptic in recent injuries came from Dr. H. Steele, our Company Surgeon at Peoria, Ill., Since then I have seen a few fragmentary articles concerning it floating around in the journals. Dr. Steele told me it was a better application for burns, in combination, I think, with cosmoline or vasaline and carbolic acid, than anything he had ever used. His recommendation induced me to try it, and I found his statements happily verified.

My experience with it, however, has not been large—hardly large enough, I fear, to justify my attempt to entertain you,—and the literature upon the subject, so far as I can learn, is meager; so that it is with a good deal of timidity that I attempt to tell you anything about it. But what little experience I have had has been so uniformly pleasant and satisfactory that I hope my paper will induce others to try it, that we may get more data upon which to found our opinions when a greater experience has been collected.

Soon after Dr. Steele had spoken to me of it, I saw it mentioned as

a valuable antiseptic, so I did not limit its use to burns, but used it in all wounds so situated that it could be applied either in the form of an ointment or sprinkled over the surface, dry. It may also be used suspended in water, or injected into the wound ; but where a wound is external I prefer to use it in dry powder, for reasons which I will mention later.

The first case in which I used the sub-nitrate on a wound was on a finger stump. The patient was a boy eleven years old, who had had his finger mashed in a threshing machine. The weather was warm and the boy rather weakly. The wound was treated at first without any special view to antiseptics, more than washing the finger twice a day with a solution of carbolic acid. It did not do well ; swelling supervened ; the wound was black, the discharges were foul and ill-smelling. The patient lost appetite, was feverish, wakeful, nervous. I began to fear blood-poisoning, and at this stage I commenced the use of bismuth. The wound was washed and filled with the bismuth in powder. The next day when the boy was returned to have the finger dressed, the wound was much better, the patient himself was feeling better, and so continued until the wound had healed.

The next case was a very interesting one, aside from the the antiseptic which was used. The patient, a young man, had a malformation of the genital organs, for the relief of which he had gone to Indianapolis to be operated upon. He fell into the hands of the Philistines and certainly was operated upon. The operation proceeded just far enough to allow the operator to cut through the urethra, when it was at once stopped ; simply doing this great harm without in the least accomplishing the object for which it was commenced. He was left in his room almost without treatment, for several days, when he was frightened away by the talk of the surgeons (?) of greater operations. Of course the new orifice contracted and it was not long before he could not urinate, and the most trying operation I ever performed was in finding the opening into the urethra without a guide. I was fortunate enough to do so. I, of course, taught him to use a catheter, for the double purpose of relieving the bladder and to prevent the contraction of the new opening. Whether it was from the use of the catheter or some other cause, an orchitis was set up, which made it necessary for me to make an opening into the sac of the tunica vaginalis to relieve the distention

caused by the effusion into it. This I did, and was alarmed at the condition affairs presently assumed. The scrotum swelled, not merely from infiltration but also from effusion. It became nearly black in color, and in fact I began to fear that the scrotum would slough off. Rigors set in, and fever would alternate with cold spells, during which he was bathed in a profuse sticky perspiration. I now commenced the use of bismuth, and almost immediately a change for the better was manifest. Healthy granulations sprang up, the wound healed nicely, and I had no trouble from symptoms of septicaemia.

The next case was a compound fracture of the Tibia and Fibula, caused by the falling of a pile of lumber upon the limb. In this case the Tibia had made an opening through the skin two and a half inches long and had been driven into the ground two inches. It was a serious question with me whether to amputate the limb at once or reduce the fracture and give the patient the benefit of a fighting chance of saving the limb. I chose the latter; cleaned the tibia and got the ends as nearly in apposition as possible, and retained them in place by a fracture box. I then covered the wound with the sub-nitrate in powder, and had so little trouble from it that none of the terrors of compound fractures were encountered, except delayed union, and the bismuth certainly was not responsible for that.

The only other case which I can relate perhaps may not be of sufficient importance to mention. However, I will give it for what it is worth. A healthy boy had his chin cut to a great depth, nearly from one angle of the inferior maxillary bone to the other. The wound healed by first intention. The sub-nitrate was used; but as wounds about the head and face heal very readily without assistance, I do not place much value upon the result in this case.\*

One of the most remarkable properties of the sub-nitrate that I think I have observed, is its power of reducing suppuration. A wound may be granulating nicely, and, so far as the wound is concerned, the patient may be said to be doing well; but an exhaustive suppuration may tell upon the recuperative powers to such an extent as to endanger life. Bismuth seems to control this to a large extent, and at the same time there is no boomerang to dodge from the effects of absorption, as there is with iodoform and carbolic acid—unless the wound is a very large one, and a great deal of bismuth used, when, I have seen it stated by one authority, that gangrenous stomatitis may

appear. The authority referred to is a German surgeon, Dr. Israel, who records his regret at having used it after amputation of the breast, in a case of carcinoma. He says : "The wound healed beautifully in ten days, but the patient developed a gangrenous stomatitis from which she suffered for eight weeks." He says the same patient presented herself some weeks later because of numerous nodules, about the size of a cherry, which she had noticed in the neighborhood of the cicatrix, and which she feared were cancerous in nature. An exploratory incision showed them to be little collections of bismuth. This is the only instance in which I have seen any adverse criticism on the use of bismuth ; and as it still remained in little nodules in the cicatrix, to act as producing cause of the stomatitis from which she had recovered, it seems hardly probable that the stomatitis was produced by it. Other surgeons have had cases of erysipelas while using it, but that is only saying that we have not yet discovered the perfect antiseptic ; nor is it likely that we will until we discover, not only what our own life is, but also the life of the myriads of opposing microscopic beings by which we are surrounded, and to which the majority of us must finally succumb.

Bismuth, when applied thickly to a wound, excludes the air. It draws away from the wound, by capillary attraction, the foul discharges which are generated in it, and holds them apart from the body until they can be washed away, and a fresh supply of the powder used. For this reason I prefer to use it dry. Its absorptive power is greater. While saturated with septic discharges, it is itself seemingly unchanged. It is possible that the decomposing discharges liberate some of the nitric acid entering into the composition of it, which operates mildly upon the surface to which it is applied, but I think the principal reason of its usefulness is its capacity of absorbing and retaining the poisonous discharges. Farther than this I shall not attempt an explanation of its mode of action. I can only say that since I have commenced its use I have had cleaner, sweeter, healthier wounds, and wounds that heal more quickly, than with anything I have ever used.

In regard to its application to Railroad Surgery, I take it for granted that every surgeon who carries a pocket case, has a bottle of bismuth in it ; that it is cheaper than iodoform and, to the country surgeon, more easily obtained, for iodoform is not yet kept in every country



drug store. It has no disagreeable odor and I do not believe there is danger of poisoning from absorption, as there is with either iodoform or carbolic acid. It is a great absorbent, taking up the discharges, thus preventing their entering the circulation, while itself remaining pure as ever. It does not form crusts and become hard nor operate as offensive matter in any way.

I am aware that these few observations make a very unsubstantial foundation on which to build anything more solid than a castle in the air; but I believe my subject has merit, and when sufficient trial has been accorded it, it will take its place among the solid structures of our profession.

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### *FRACTURE OF THE PELVIC BONES.*

By H. B. BROWN, M. D., Lincoln, Ills.

Fractures of the pelvic bones require a peculiar force for their production, and will not unfrequently demand the care and attention of the Railway Surgeon.

They differ from other fractures, in that they require more force for their production, are not so easy to diagnose, and when displaced are more difficult to adjust and retain in position; because the displacement is nearly always from without inward, or toward the center of the circle formed by the pelvic bones. Surgeons usually regard these fractures as being of a very serious nature; not that a simple fracture of one of the bones of the pelvis is so much more dangerous than some others, but the relation they sustain to the pelvic viscera, make wounds of these organs a common and dangerous complication; so that not unfrequently we may have injury to the urethra, bladder or peritoneum, either by a rupture of one or more, or the ends of the bones may be driven into them by great force.

Ordinarily, simple uncomplicated fracture of one or more of the pelvic bones, unite readily and directly, as illustrated by numerous reported cases.

Sir Astly Cooper reports two cases of fracture of the pubis, not accompanied with injury to the bladder or urethra, which resulted in complete recovery. In the second case, recovery was complete in eight weeks; and the patient could walk nearly as well as before he was injured. He soon after died of some other disease, and the

autopsy revealed the os pubis broken in three places, a fracture in two directions through the acetabulum, also a comminuted fracture of the ilium with great displacement. Hamilton reports a number of cases of simple fracture of the ilium where the recovery was rapid and complete. Two cases are reported from the Massachusetts General Hospital, one of compound fracture of the ilium, from which some pieces of bone were removed, the other ilium and ascending ramus of the pubis; in both the recoveries were good. But when these cases are complicated with injury to the bladder, urethra or peritoneum, as is frequently the case, the results are very different, and recovery is the exception and not the rule. The ease with which fractures of the pelvic bones are diagnosed, differs about as much as the severity of the injuries; and much care and judgment must be exercised in the examination of these cases. First the *character* and direction of the force must be inquired into. We know that most generally they will follow some crushing force about the hips, as a heavy weight falling upon them, or wagon passing over the body at this point; or as Railway Surgeons, that our patients have been caught between two cars, or a piece of timber and a car, while attempting to couple. Here the pelvis receives the full force of the pressure, and fracture is most likely to occur; then there would follow an inability to rise or walk (unless it involve only a small portion of the crest of the ilium), which symptom Travers has claimed to be diagnostic of a fracture through the acetabulum; but while it may be true that a man with a fracture through the acetabulum can not stand or walk, surely he would be less able to do so were the ischium or pubes broken.

Crepitus, the chief positive sign of fracture, is sometimes easily obtained; this is more especially true in fracture of the ilium than of the ischium or pubis. The two latter bones, situated as they are, partly imbedded in thick fleshy muscles, makes any manipulation of them quite difficult. Hamilton cites a case as reported by Dr. Clark, of Massachusetts, in which the pubis and ischium were broken in three places, as revealed by the autopsy, yet no crepitus could be obtained in the examination. When direct examination of the bones fail to reveal this important sign, manipulation of the thighs often aid us very materially in its production.

With these few remarks I wish to report the following case, not that there is anything unusually new about it, but it will add one to the

number of a very interesting class of cases : W. D. Plimpton, age 38 years, occupation a bridge carpenter ; strong, healthy man. On March 23rd, 1880, I was called to see this man, who, I was informed, had been caught while attempting to couple cars, between the projecting end of a large timber which was lying on one car, and another car. He was held in this vise for at least one minute before he could be released ; when he immediately fell to the ground, being unable to stand. After conveying him to a suitable place and removing his clothing, I found the blow was received just below the crest of the ilium, which was bruised over quite a surface, and the skin knocked off over quite a surface.

Rotation of the thigh was good but quite painful ; the legs were of the same length, but the foot and toes of the right leg were everted ; they could be placed in their natural position but if left alone would turn out again, and the patient said he felt much more comfortable when the legs were in their natural position ; complains of a great deal of pain in and about the left sacro-iliac region ; when we attempt to lift or move him in bed he says it feels like his back-bone would come loose from his pelvis. While manipulating the right thigh I felt a distinct and coarse crepitation, as though there had been a large surface of fractured bone slipped upon itself. This was the only means by which crepitus could be *elicited*. Pressure on the ilium and pubis were quite painful, but failed to produce crepitation. Measuring from the anterior spinous process of the ilium to the spine of the pubis, I find it three-fourths of an inch less on the right than on the left side, the fracture evidently existing between these two points, although no distinct line could be determined. My impression at the time was that the break was in the ilium and involving the acetabulum, but as the patient recovered, I can not furnish you with its exact course. A bandage was applied around the hips and thorax, and he was placed in a good position and morphia administered. On the day following he complained of a great deal of pain across his bowels and back ; his knees were tied together, but from the intense suffering had to be released ; passes his urine often, but it contains no blood ; placed the leg in a straight line and applied Buck's extension with a two-pound weight, which assisted very much in keeping it in a natural position ; but still there was some inclination of the toes to turn out. After six days the patient was removed to his home, in Urbana ;

first applying a long splint to maintain, as well as possible, the natural and most comfortable position. The reports that came to me after this indicated some peritonitis and his life was dispaired of for a number of days.

On the 17th of June following the patient came to see me from Danville; with the use of a cane he could walk slowly, without limping; still has some pain and tenderness on the left side, also pain upon deep pressure upon the right ilium; the anterior portion of the crest of the ilium is fully an inch lower upon the right than upon the left side; some difficulty of flexing the right thigh upon the abdomen. He has called to see me a number of times since and when I last saw him was a strong man again.

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### *THE IMMEDIATE CARE OF THE INJURED.*

By O. P. McDONALD, M. D., of Keokuk, Iowa.

While the various branches of surgery are being advanced with energy and with all wisdom of mature learning and experience; while Listerism and anti-Listerism have their zealous advocates, we are getting nearer the great truth that meddlesome surgery is bad, and that all wounds should be kept in a thorough antiseptic condition. While splints of every variety, and dressings almost without number, from the time-honored fracture-box to the most approved invalid bed; from the old-fashioned shingle to Slager's favorite plaster dressing; all are serving their purpose in leading us toward the goal of our ambition, *i. e.*, the best results attainable and the greatest amount of ease and comfort to the wounded. While these rapid strides are being made, Railroad Surgery is fast stepping to the front. To this I wish to add my mite by calling the attention of this society to what seems to have been partially overlooked, or at best not to have received the attention its importance demands, namely: The want of care and misguided but kind attention received by the wounded from the time of the accident until the surgeon gets control of the case; also to raise some question of treatment which had been sanctioned for years.

The want of care to which I call attention is, that there is no one of the employes of the road who, having been instructed, is ready to say what is to be done with this man, or how; but they are picked up in all kindness by their companions and carried in their arms one, two or three blocks. Take a case: A man having received a compound fracture of the leg, or any equally serious wound, is carried in this



way by men who, stepping over ties and rails, are unable to keep step, from one end of the railroad yard to the other, without a stretcher, without blankets or anything to protect him in his prostrated condition from the chilling wind ; without pillow or cushion. Add to this that they are drenched with whisky, and poor at that, until what was intended as a needed stimulant becomes a relapsant and renders them still more subject to the chilling sensations and prolongs the condition of shock.

Now these men are made special objects of our care, and we can not plead that we did not know that they would be wounded, for we do know that a certain per cent. of the employes and of the traveling public this and every year will be wounded.

In addition to their injuries these patients are suffering from shock, which it is of the utmost importance to relieve and shorten in every possible way.

In regard to treatment of shock, Ashhurst says that external and internal stimulation should be employed with dry heat ; that opium is invaluable. Branton speaks of that powerful heart tonic, heat. Fuller, of Montreal, says that alcohol is far inferior to opium. Professor Albert Burns' treatment is heat and stimulants with opium. Professor Hutchenson, F. R. C. S., says, generally it is enough to place them in a recumbent position and apply heat to the extremities. Holmes says the warmth of the body must be sedulously maintained. All are agreed that heat is essential.

If, then, warmth and even heat are second to none as restoratives, how much more important is it to prevent, so far as possible, anything like chilliness, to lose no time in re-establishing and maintaining the normal heat of the body, and especially of the wounded member? In this we are aided by the telegraph and telephone, not only in summoning the surgeon more promptly, but also enabling him to give directions which will be of great benefit in case those whom he should have instructed are not at hand. All will agree with me that the first hour after receiving a severe injury is more important, than any other time ; that more can be done in that brief space of time than in days after ; that in some cases the first hour may and does decide the question whether the wounded member can be saved, and may even decide the question of life and death.

What preparation is there at any of our depots outside of the great

railroad centers for the immediate care of the unfortunate? Knowing as we do that these cases must and will occur, and the importance of the most prompt, skillful treatment in many of them, ought we not to make all reasonable preparation for their immediate comfort and safety?

My suggestions are that a stretcher be provided, a piece of oil-cloth, a pillow, comfort or blanket, together with a bottle of medicine, composed of morphine and brandy, or some similar remedies, which quiet and stimulate the wounded—full directions being written on the bottle; that two or three most suitable employes be instructed by the surgeon how to arrest hemorrhage; to put the patient in the most comfortable position; to see that he is kept perfectly warm, especially his feet and the wounded member; how to administer the restoratives; but that nothing is so important as warmth and fresh air. The restorative medicine being furnished and at hand will serve a double purpose: The relief of the suffering and shut out the too common practice of giving large doses of poor whisky. Some may ask, do you not believe in whisky? Yes; I believe in a little, but do not much. So, also, with morphine, which in small doses is an invaluable stimulant, but in large doses is narcotic and sedative.

If given together in small and oft-repeated doses, we have a double stimulant and quietus. Let the dose of morphine be one-eighth of a grain; of whisky, or brandy, a tablespoonful, and let these doses be repeated, if need be, every quarter to half hour until relief comes.

The directions in regard to heat, fresh air, and quiet, will do a world of good in themselves, while they prevent the long-used but dangerous cold water applications, which do great harm if used before reaction comes about. Here let me state that hot water will check hemorrhage quicker than cold, is always safe in wounds which have just been received, and that no wet application should be used cold to any injury until the condition of shock has passed off.

When the accident occurs at a distance from town, the preparations mentioned will be a great help to the surgeon in getting the patient home, for whatever temporary dressing we may use, the stretcher, pillow, &c., will be very useful in severe cases in helping to bring them home more comfortably than it is possible without them.

With these preparations and others which you may be kind enough to add, and two or three reliable railroad men who are the most likely to be at hand, instructed as to the immediate care of the wounded, we can have charge of these men almost from the very first, instead of their being left to the zealous but misguided care of the boys.

As rail road accidents are admitted to be more serious, owing to the great momentum of the bodies causing the injuries, it seems important that the surgeon should get control at the earliest moment, especially is this true in the severest weather.

I have taken up some of your valuable time, hoping that by your kind assistance, certain prevalent errors may be corrected and the best care and treatment assured to the unfortunate at the earliest moment after the accident.

It is too much to hope that by thus getting and keeping control of these patients, almost from the time of the accident, we may be able to save an arm, leg, or even life, which if left, as they sometimes are exposed to more or less of cold and wrong treatment the shock prolonged and intensified would be sacrificed.

By thus getting our patients into a state of ease and comfort, the temperature of the body being brought to the normal standard and kept there, we will save pain, time, and that which is of the most importance will prevent or shorten the shock. Another prevalent error is to anticipate inflammation by commencing the antiplogistic treatment before reaction is established.

Can there be any greater danger or folly than this? Are we to be so afraid of inflammation as to allow the shock to be lengthened, and by beginning the use of sedatives, while our patient is still struggling with his first danger?

No doubt we should use these stimulants chiefly which are most transient in their effect, such as ether and ammonia; the different preparations of opium being an exception, but we should free our patient of the first danger before anticipating the second. Need we fear the inflammation if we are ready to grapple with it in its incipency while we have morphine, which in free doses not only gives complete relief from pain but is also the king of sedatives with aconite veratria and a long list of local remedies?

The directions to be given those who are to act until the surgeon arrives with reference to protection from cold and chilling winds are

appropriate for nine months in the year, and even the other months have some days when the wind will be too cool for a man whose temperature has suddenly been brought down to 95, and whose skin was bathed in perspiration at the time of the hurt.

In looking the subject up, I have been surprised at the loose way in which our authorities speak of the use of morphine and brandy in so important a trouble as rail road shocks ; true, they cover the whole ground and put forward the best remedies. What is surprising, is that they speak of giving morphine freely and brandy according to the case instead of recommending small doses, as both are very important stimulants in small doses and decided sedatives in large.

I hope that other and better suggestions will be made that the important period immediately following the accident may be robbed of its errors and the greatest good accomplished.

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### *SURGEONS' DUTY IN RAILROAD SPINAL INJURIES.*

By F. L. MATTHEWS, M. D.

The cause being known, with some degree of certainty the effect may be predicted.

The velocity being the same, the weight of a moving body becomes the weight of its momentum. Hence the severity in type, of accidents upon ponderous trains, as compared with the average casualties to which the great moving human masses are daily subjected. While Conservatism is the watch-word of modern surgery, the railroad surgeon of all others is least likely to thus immortalize his name. Human digits fairly caught between draw-heads, or limbs upon the track under moving wheels, are too often doomed ; and prospective good stumps, well covered and free from tender cicatricial tissue, is the problem for surgical solution. Conservatism that even *risks* a perpetual source of discomfort, is of doubtful propriety, since, in the great majority of stumps, the little salvage thus secured, is, practically, no compensation. Human nature gracefully acquiesces in painless deformities, but a tender, painful stump, is a constant thorn in the flesh—a ceaseless reminder of the imperfections of the surgical art—and a standing criticism upon the luckless operator. Upon the point of severity, we suggest that farther evidence is within easy reach of the surgeons-in-chief of our great railway systems. Reports of subordinates, so



utilized as to present a classified statement of all injuries sustained by operatives, contrasted with those incident to the passenger traffic, would clearly establish the comparative gravity of the former. None, however, are trivial, when we call to mind contingent circumstances. Every case in either class creates a company responsibility which tends to excite the avarice of the victims. That corporations have no souls, seems to be a deeply-rooted sentiment, and more than suggests a quasi excuse for any available sharp practice, when the private individual institutes legal proceedings. Conduct that would shock the moral sense of private combatants,—when pitted against a corporation,—bears lightly upon the conscience. Even elasticity of conscience, necessary to suit any *given* case, is hardly considered a crime, and moral rectitude sustains the strain with apparent composure. To further moralize upon these points hardly comes within the province of my paper, and, with a more extended statement of facts, I hasten to consider what, under the circumstances, constitutes the full duty of the railroad surgeon.

First in importance is the physical welfare of the sufferer,—to see that every call for immediate action meets a prompt response. This will include the resuscitation from violent shock, staunching dangerous hemorrhages, applying temporary support to fractured bones, removal to comfortable surroundings, &c.; in a word, to render such instant relief as comes within the province of our noble art, directed by true skill and prompted by the purest human sympathy. This much we owe to the unfortunate victims. Does this comprise our full duty? A little forethought, right here, will often tend, and justly, too, to grateful recognition, on the part of those whose interest it becomes our duty to subserve, to the extent, at least, of watching against speculation and fraud. Unpremeditated statements are always the most truthful and reliable. Verbatim records, taken upon the spot, often furnish rebuttal evidence that overthrows theories subsequently manufactured to meet anticipated emergencies. While this in no wise detracts from the invaluable services rendered the afflicted, and in no respect offers an obstacle to the operation of strict and impartial justice, it *does* contemplate protection against fraud, by strict conformity with the *letter* and *spirit* of the Golden Rule. Varying circumstances, alone, will decide as to the most important data to be secured. I need only drop a hint as to the general procedure and

requirements. Get, if possible, the injured person's own statement, including velocity of train, his position therein, the direction of the force producing the injury, the nature and extent of all external signs of same, also what may be gathered from eye witnesses unhurt, while reverential awe and overflowing gratitude for self-preservation prompts to honesty, both of deed and purpose. Be not too chary of a little labor, but bear in mind that items which at first might seem unimportant, often prove the very links that perfect the chain. In most injuries, the result of direct force, producing either contusion, laceration or crushings, examination readily suggests the necessary surgical attention; but in casualties with no external signs of violence, but which involve the central nervous system, *more* time and greater care is necessary to determine the nature, locality and magnitude of bonafide cases, as well as to guard against imposition, which I am ready to believe has been successfully practiced. Veritable cases of spinal trouble, even among those who, at the time, congratulated themselves upon their escape, have superinduced, and have proved serious and intractable. Such cases furnish an opportunity for the sinister-minded to attempt deception, and call for caution and professional keeness. Such developments should excite suspicion; enough, at least, to prompt the closest scrutiny, to the end that all attempts at real deception may be promptly checkmated and exposed. While no definite instructions can be given as to the management of these exceptional cases, the surgeon, in possession of all available data bearing upon each, has an opportunity to draw upon his inventive genius, and his conduct may be so well timed and discrete as to simulate the healing virtues of his best remedies. Bear in mind, the necessity of much thought and little talk; that mischief comes from thoughtless talk, rather than thoughtful silence. No class of injuries demand nicer discrimination than those of the spine,—implicating the cord. The whole length of the spinal cord shows a monotonous anatomy. The same elemental structure pervades, so far as we know, its entire length. The same may be said of its membranous coverings, both as to structure and arrangement. The same violence that has produced injury to one part would, if applied to another, induce the same morbid changes, or pathological conditions, but the outcrop of symptoms will depend upon the seat of injury. The precise character of these will afford rational hints as to the nature, as well as the

locality of the morbid processes producing them. Spinal troubles from accidents will hardly offer the same difficulty in diagnosis as those *diseased* conditions, which we often meet—the remote cause being, perhaps, as much of a mystery as the disease itself. In railway surgery we contemplate *accidental* cases, developing immediate symptoms—the spine, previously healthy. Sudden developments, from localized injury, whether of an extrinsic or intrinsic character, will constitute a clearer index of the morbid process than those which supervene upon progressive disease. It is no exhibition of ignorance, but rather of frankness, to admit that there are, in grave injuries, certain combinations of symptoms, common to varied diseased conditions, which can not, with any degree of certainty, be promptly differentiated, and which the lapse of time alone makes clear. Paralysis of sensation and voluntary motion, supervene upon compression of the cord, no matter what the immediate cause. The slowness or promptness with which it appears,—the amount of territory it invades, the length of time it continues,—the mode and manner of its disappearance, all teach us a lesson which could not be foretold, but when learned, furnishes the solution to an interesting but difficult problem. Injuries, as well as diseases of the spine and its appendages, have not received the same attention, or been subjected to the same persevering research, as obtains in other medical and surgical investigations, by reason of the prevalent impression of their hopeless character.

The neglect, as to the spine, is even more apparent than in troubles involving the brain. The proper surgical attention in cases of violence to the head, producing compression, by fracture, and depression of the skull, have *always* been promptly rendered, and, as a rule, governed, of course, by temperament, tendency to inflammatory action, amount of actual local disorganization, &c., in each individual case, with most gratifying results. The spinal cord, as an appendage of the brain, is no less delicate or sensitive,—subject to the same injuries and the same morbid processes, liable to the same functional derangements, but circumscribed in proportion to the remoteness of seat of injury from the great center upon which it solely depends. The effects following compression of brain are so universal as to simulate death, and demand, at once, any warrantable proceeding for its relief. In spinal compression, that same similitude of death obtains,

in every part dependent for its functional life upon that portion of the cord below the point of injury ; but the freedom of all remaining functions so robs the case of pressing importance as to invite moderation, and, in many cases, I believe, actual neglect.

In all cases of evident compression, the removal of the cause is the point at issue. If it be from effusion of serum-blood, or the result of inflammatory action, the surgeon may at least guard against farther aggravation of the cause, and, by the use of local and constitutional means, aid nature's efforts—the all-important factor in the curative process. If, with this train of symptoms, actual deformity co-exists, in the light of statistical knowledge upon this point, past timidity, in the presence of either spinal luxation or fracture, must give place to positive efforts at reduction,—the only hope of relief. While the records show but one case of immediate death from such manipulation, Dr. Ashhurst reports thirty-four cases thus treated with but four failures. In many cases the success was indicated by an audible snap, and in several the paralysis was instantly relieved. The spine is the grand central support of the entire osseous system, and the cord, under the control of the will, the battery power of all voluntary muscular movement. It takes cognizance of all muscular effort, whether voluntary or involuntary. The muscular tonicities produced by anticipated efforts, serves as a protection against shock or concussion, and, with such preparation, the sudden expenditure of force or resistance against external momentum that would fall harmlessly, might, coming unexpectedly, and during perfect relaxation—more especially if applied so as to produce a twisting wrench,—be the occasion of such violence to the whole spine as to induce permanent disease. There may be a condition thus induced that slowly develops, the first noticeable evidence varying from a few moments to days or weeks after the accident. All these conditions might readily obtain in railway collisions. The force and rebound is sudden and unexpected. The violence, though governed by circumstances,—velocity, weight of train, &c.,—is never slight, and the injury done to individual passengers, from this cause alone, will depend upon the position of body and the disadvantageous application of the force.

The “Railway Spine” of which Mr. Erichson speaks, is thus produced, and accounts for a train of symptoms that sometimes supervene, when not only was there no external evidence of accident, but



the victim, under the confusion and excitement of the moment was, for a time, able to minister to the immediate wants of sufferers, entirely ignorant as to his own mishap. One such, in the wife of a prominent employe at the W., St. L. & P. Railway headquarters in this city, who was a passenger in a Pullman car thrown down an embankment near Kansas City, last summer, came under my own observation during the past winter. She was extricated from the wreck and walked to a neighboring house before realizing that she had sustained an injury, from which she has not yet fully recovered. Symptoms in these cases are not so characteristic as obtain in marked spinal injuries, but simulate general prostration, great loss of muscular power, and are often accompanied with strange perversion of the special senses.

There is some question as to the existence of an absolute permanent disease, some eminent writers claiming that such instances denote nervous shock only and are susceptible to treatment, and under favorable circumstances may recover. While it may be true that serious results sometimes follow causes apparently slight, and that railway collisions offer facilities for every grade of severity, from the slight to the most aggravated, it behooves the railway surgeon to exercise great caution and wait further developments ere he settles upon Railway Spine as his diagnosis, since similar neurotic cases were not unknown even before the days of Railway Surgery. Medical literature is still limited and unsatisfactory upon this important class of injuries. Practical generalities seem to have been the purpose of our best and most reliable writers. This paper contemplates nothing new and startling in the line either of diagnosis or surgical treatment, but will have accomplished its full purpose if, on your part, practical inquiry, close and intelligent scrutiny, shall receive a healthful stimulus and lead to the collection of such data as will add both life and interest to our future deliberations.

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## *COMMINUTED FRACTURES OF THE UPPER EXTREMITY.*

By H. C. HOWARD, Champaign, Ill.

The subject assigned me by our worthy chief, that of Compound Comminuted Fractures of the Upper Extremity, is one that of all times has been a dread to the surgeon and a warning to the patient, that the loss of the limb is possible or at least a defective result.

To give a concise history of compound fractures of the arm would be to give the history of each separate case, as no two in any surgeon's experience are of the same character, yet the general outline of all have a marked bearing on the treatment. All cases of compound fractures have first to be thoroughly studied before treatment can be instituted. The amount of injury to important vessels and nerves is to be carefully noted. The amount of comminution of the bones is of but minimum importance when compared with the destruction of nerves and arteries; with these intact, the bones of the arm and forearm may be in many pieces and yet a fair result be confidently expected. The muscles, even, may be severed from their attachments to some extent and yet a serviceable arm obtained.

The most difficult of these fractures, which we are called upon to treat, are those at the elbow and its immediate vicinity. Take for example an arm crushed between deadwoods, likely crosswise, as the arm is most likely to be caught in this position when coupling, and what can we expect? Certainly not in all cases, amputation. That would leave many a man a poor prospect in life with only a short stump as an assistant; not exsection, because with a small fragment of the joint removed a better result should be secured than by its total removal.

In many cases of these crushed fractures the arteries and nerves are found intact while the bones and fleshy portions are much comminuted, yet we have succeeded in saving many of this class. The same general principle of treatment will apply to these severe cases as to the simple fractures. The general precept in treatment of this class of cases is to control the inflammatory action which will always follow that only good results shall be attained. To do this, the temperature

must be controlled at the same time that the fragments of bone are kept in position by a properly adjusted splint. Here is the point where most surgeons fail. A properly adjusted splint holds the parts in position without undue pressure at any one point, and particularly without compressing the already obstructed vessels. No pressure of a splint should, for a moment, be tolerated on the part of a fracture. All necessary support can, as a rule, be obtained on the uninjured portions of the limb while the compound parts can be left fully exposed for treatment by irrigation. To accomplish this point with a compound fracture of the elbow joint, no splint will answer the purpose so well or fill the indications so perfectly as a splint made of zinc, galvanized iron or some material of like nature made in this form. (Exhibited splint.) The object of this form of splint is apparent to all. You get the support for the arm above the point of fracture or the humerus : the forearm is supported below the point of injury. Both places of support being at anatomical points where there is little danger of obstructing the circulation and yet leave exposed all the parts which require watching. This form of splint should always be made to fit the case under treatment, as I have found it, as a rule, that no splint can be used on a severe case without modification. Thus every case must have some modification of the splint for adjustment to its particular fracture.

Take, for example, a case where there is a crushed fracture of the condyles of the humerus with a complex fracture of the shaft just above the joint, with the fragments protruding on both sides, and usually in front. How are you to dress such? You cannot place a splint over the point of fracture. You cannot use pressure even with a bandage to any great extent with safety. Then shape your splint to fit the arm, not the arm to fit the splint. Make the upper portion of the splint short so it shall not touch the fractured part, yet keep enough of the shaft of the humerus under control of the splint to keep the arm in shape. Adjust the forearm to the splint and hold it in position without interference with the fracture, but to hold the arm in a normal position. Then you have complete control of the limb without interference with the circulation, and in such a manner that the crushed parts of the limb are in their normal relation with one another. This form of splint, while it fixes the arm perfectly, admits of the application of irrigation while the moisture has no effect upon

the material of the splint, neither causes it to loose its hold upon the parts. Thus you have control of the arm while you are at liberty to apply any treatment to the comminution which you may wish. With me, nothing takes the place of water at a temperature suited to each individual case, some requiring a high temperature, others low.

Case 1st. Master John S. Two and one-half years old, compound comminuted fracture at left elbow. Humerus fractured one and one-half inches above the joint, condyles separated, one protruding on the anterior internal side, the other, posteriorly. Fracture of ulna just below articulation, with lower end of upper portion protruding posteriorly; fracture produced by a plank 2x6 falling edgewise on the arm while on the ground. This case was, by several surgeons who saw it, pronounced hopeless and amputation was advised. It was found on examination that, if the pieces were replaced in position and the forearm semi-flexed, the circulation at the wrist was good, and feeling restored. Finding such to be the condition, an effort to save the arm was decided upon, a splint of this form was constructed, the arm adjusted, and to-day the young man is in active life as a painter. In this case after adjustment the arm was placed upon a straw pillow with a constant stream of water, at a temperature of about 90 degrees passing over the arm keeping all parts fully wetted and the temperature normal. This case, occurring at the age of two and one-half years, was again the subject of fracture of the humerus at about the same parts, at the age of ten years, by being thrown from a horse, and yet by following the same line of treatment, the arm is almost perfect in its motion and with only slight enlargement of the articulation. As this case was of a child it cannot be classed as a railroad case, but the following can be called by no other name.

Case 2d. Mr. H., age 38, conductor, left arm caught between deadwoods of cars in coupling. The left arm was expected to be above the deadwoods, but by a slight slip of the foot it dropped sufficiently to permit the corners of the blocks to catch the elbow and be of such force as to start the cars. The inner condyle was caught, the outer not, producing a compound fracture of the condyle and almost completely crushing it. The artery was found intact with sensation only partial. It was decided to attempt the saving of the arm even at the risk of a secondary operation and likely an ankylosed joint. The case was at once adjusted with a zinc splint in a semi-



flexed position, no pressure being used on the point of fracture; the arm placed in a comfortable position on a straw pillow with the elbow constantly under a stream of warm water and warm applications to the forearm. This case was of much interest as several pieces of the inner condyle were removed at the first dressing and it was expected that the joint would be ankylosed. But by passive motion of the joint, began at the end of the second week, the man was able to resume work at the end of three months, and now has a very serviceable arm, although the motion is not quite so free as normal. In this case the temperature of the water used in irrigation, had to be changed several times to suit the varying temperature of the parts under treatment. It was not necessary to wholly remove the splint to obtain motion, but only to loosen the bandages on the forearm. When you have control of the same, and yet keep the whole arm in perfect adjustment, you can make use of extension and at the same rotation, and then restore the arm to its normal position on the splint.

I do not wish to consume the time of the society and will give only one more case, as this will complete the illustration of the principle which I wish all to understand, that no fracture should be treated except on correct mechanical principles, a point too often lost sight of in the treatment of even the commonest fractures.

Case 3d. Mr. B., age 26. Left arm caught in a callender machine. Was caught by the fingers when trying to smooth cloth in the commencement of a roll. The hand being caught, was wound around a four-inch square shaft, breaking some of the phalangeal bones, displacing the carpus, fracturing the radius and ulna in several places. Ulna protruding three inches, tearing a hole in the cloth and protruding the same. Extensor muscles of forearm torn from their attachment near the elbow and crushed between the layers of cloth. Elbow partially dislocated and the soft parts of the arm so badly contused that sloughing followed on one-half of its inner surface. This was a case that, with ordinary care, would have demanded amputation. Amputation was my first thought, but upon close examination, I found no place short of the shoulder joint where a round flap could be obtained, and to have amputated at the shoulder would have been death in his condition. This arm was dressed by removing all loose pieces of bone. The crushed portion of muscles were care-

fully pared off, and all parts adjusted, as near as possible, in the normal position, a splint of this character made for the case and applied, water of suitable temperature in constant stream to the whole length of the arm, while the arm was resting on a pillow in as comfortable position as was possible. Some sloughing followed, but the re-adjustment of splints, to avoid the sloughing parts, was all the change made. Passive motion was secured after the fourth week. Some loose splinters of bone were at times removed, and at the end of four (4) months the man was able to be about the factory, but with slight ability to extend the fingers, the extensor muscles of the same being pared off in the adjustment of the parts. At this time, one year after the injury, he has very good use not only of the arm but can use his fingers to good advantage, though not perfectly.

In reporting these cases I do not wish to be understood that no cases of compound fracture of the arm require amputation or exsection, but many, that are now sacrificed, can, with due care of the surgeon, be saved to make very serviceable arms. Too often the surgeon sees that by amputation a quick recovery is at hand and a good looking stump secured, the man a cripple, and the surgeon saved time, and the danger of trouble from an imperfect result. Yet with all this before him, is the surgeon justified in the sacrifice of the arm when there is a possibility of recovery even with an imperfect result? Such cases are and will be presented to us, and our best judgment should be exercised for the benefit of the sufferer, and when any reasonable hope exists always to give the patient the benefit of the doubt, although by so doing we take upon ourselves increased responsibility and liability without its proper modicum of remuneration.

*PROCEEDINGS OF THE THIRD MEETING OF THE  
SURGEONS OF THE W., St. L. & P. RY., AT  
SPRINGFIELD, ILLS., APRIL 30, 1884.*

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The members of this Association met in the Senate Chamber at Springfield, Ills, at 8:30 A. M. The meeting was called to order by Dr. J. T. Woods, of Toledo, Ohio, the Surgeon-in-Chief and President of the Association.

The calling of the roll was, by consent, dispensed with until the afternoon session.

The minutes of the previous meeting were read and approved.

The first paper read was on "Compound Comminuted Fractures of Elbow Joint," by Dr. H. C. Howard, of Champaign, Ills. It was a good paper, and was listened to with much interest.

Dr. Linvill, of Columbia City, Ind., stated that the paper of Dr. Howard was a good common sense paper, and he especially endorsed the application of the warm water dressing in such cases.

Dr. A. U. Williams, of Sullivan, Ills, also made some practical remarks on the paper.

Dr. Beasley, of Lafayette, Ind., stated that he had treated a case much the same as one of the cases reported by Dr. Howard.

The next paper was by Dr. W. T. Beadles, of Bushnell, Ill. The History of the Management and Treatment of Railroad Injuries and Objections to the Use of Hot Water in Arresting Hemorrhage in Amputation. This paper showed great care in its preparation and will be read with much interest by all surgeons. Quite a number of the surgeons present spoke in favor of the paper, while some disagreed with the author's views in the use of hot water, believing it to be a valuable styptic.

Dr. N. N. Vance, of Bement, Ills., read a paper on the "Medical Treatment of Surgical Cases."

Drs. Beard, Williams, Davis and Linvill made some practical suggestions on the paper read.

A communication was received from Dr. J. Rauch, Secretary of the Illinois State Board of Health, inviting the members of the Association to call at his office sometime during the session.

On motion, the invitation was accepted, and the time named was 11:30 A. M.

The next paper read was by Dr. O. P. McDonald, of Keokuk, Iowa, on the "Immediate Care of the Wounded," in which he made some very valuable suggestions.

Dr. George F. Beasley, of Lafayette, Ind., read a paper on "Eucalyptus as a Dressing in Surgical Cases."

Dr. Howard made some practical remarks on both of the last papers read, and recommended the use of alcohol as a local application in surgical cases.

The time having arrived to visit the office of the Secretary of the State Board of Health as agreed upon by motion, the Association adjourned until 2 P. M., and, in a body, repaired to the office of Dr. John Rauch, the well-known Secretary of the best State Board of Health in this nation, and which has done more to elevate the standard of medical education than all the resolutions ever adopted either by County, State or National Medical Associations.

The members of the Society spent a half hour very pleasantly in this office examining documents, etc., the doctor and his assistants taking special care to answer the questions asked and furnish documents to all who desired them.

The Association tendered the Secretary, his clerks and assistants their thanks for the kindness shown them.

The Association met in the afternoon at 2 o'clock. In the absence of the President, Dr. W. J. Chenoweth, of Decatur, Ill., presided.

The roll was called, and the following surgeons answered to their names :

Ohio and Indiana Division—C. B. Stemen, Fort Wayne, Ind.; A. H. Shaffer, Huntington, Ind.; G. F. Beasley, Lafayette, Ind.; J. C. Bucher, Andrews, Ind.

Detroit and Indianapolis Division—A. J. Mullen, Michigan City, Ind.; A. L. Elder, Fisher, Ill.; T. B. Campbell, West Lebanon, Ind.; D. G. Linvill, Columbia City, Ind.; F. W. Fanning, Butler, Ind.

Illinois Division—C. V. Rockwell, Taylorville; H. C. Fairbrother, East St. Louis; H. S. Carver, Bluffs; E. C. Hays, Hannibal, Mo.; B. M. Griffith, Springfield; P. C. Diffenbacher, Havana; W. E. Schenck, Pekin; W. J. Chenoweth, Decatur; N. N. Vance, Bement;



A. L. Whitcomb, Tolono ; W. C. Morehouse, Danville ; F. L. Matthews, Springfield.

Cairo Division—F. W. Beard, Vincennes, Ind.

Peoria Division —O. P. McDonald, Keokuk, Iowa ; W. T. Beadles, Bushnell, Ill. ; Z. E. Patrick, Sheldon, Ill.

Chicago Division—A. U. Williams, Sullivan ; H. N. Brown, Lincoln ; H. C. Howard, Champaign ; John Davis, Englewood ; D. Duckett, Forrest.

The matter of publishing the minutes and a full report of the papers read before the association was discussed. The general sentiment was favorable to the publication, and, on motion, it was decided to make an assessment of \$2.00 per member of the association to defray the expenses.

The following resolution was adopted :

WHEREAS, Dr. J. T. Woods, chief surgeon of the W., St. L. & P. R. R. company, has, by his kindness, ability and untiring energy, placed us all under great obligations to him ; therefore, be it

*Resolved*, First. That we deem it fitting and proper to express our appreciation of the kind and efficient manner in which he has discharged all the duties devolving upon him in his relations to us.

Second. That we believe the system of railroad surgery which has been perfected by him on the W., St. L. & P. railway is one of the best and economical ever organized.

Third. That this system of accident reports, which has been adopted, in part or in whole, by many railroad companies of this country, has had the effect of saving to this company, in the way of litigation expense, much more than the entire expense of the surgical department.

Fourth. That the effect of this system, as planned and executed by Dr. Woods, has been of great value to the employes of the company in placing at their hands, when injured, the best medical and surgical ability to be had at the various localities along the line of the road.

Fifth. That we hereby express our thanks to Dr. Woods for his kindness shown to us on various occasions, and our hopes for the continuance of the pleasant relations.

(Signed)

H. C. FAIRBROTHER.  
W. J. CHENOWETH.

The election of officers for the ensuing year resulted as follows :

Dr. J. T. Woods, of Toledo, President ; Dr. B. F. Griffith, Vice-President ; Dr. C. B. Stemen, Secretary and Treasurer.

On motion, the President and Secretary were appointed a commit-

tee on publication, and also authorized to arrange for the meeting of the Association as to the time and place.

There being no other executive business to attend to, the next thing in order was reading of the papers.

Dr. W. T. Beadles was called to the chair.

Dr. Chenoweth then read a paper, stating the various classes and causes of 100 injuries, and said that with some care, a table showing the number and kind of injuries from the several causes could be made and would be of interest.

Dr. H. C. Fairbrother, of East St. Louis, discussed the paper and made some practical remarks on some of the cases reported by Dr. Chenoweth.

Dr. A. L. Whitcomb presented a well written paper on "Attention to the Bladder after Railroad Injuries."

A number of the surgeons took part in the discussion of this paper.

"Traumatic Erysipelas" was the subject of a well written paper by Dr. A. U. Williams, of Sullivan, Ills. Dr. E. C. Hays, of Hannibal, Mo., and others took an active part in the discussion of the paper.

Dr. C. B. Stemen presented a paper on "Color Blindness."

The "Report of a Case of Fracture of the Pelvis," by Dr. H. B. Brown, of Lincoln, Ills.," was the subject of a paper which was of much interest.

Dr. F. L. Mathews, of Springfield, Ills., presented one among the best papers read during the session, on "Surgical Duty in Railway Spinal Injuries," showing the best and most successful manner of treatment in the various phases of injury. It was listened to with much interest.

The session was a profitable one to all who attended it. Many of the papers read were thoroughly and ably discussed. On motion, the association adjourned.

J. T. WOODS, M. D., *President.*

C. B. STEMEN, M. D., *Secretary.*

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